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MASTER THESIS

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GLODEP 2022

Women Empowerment in Agriculture and Household Hunger: Evidence from Bangladesh and Uganda.

Supervisor: Professor Maria Sassi (Ph.D.)

Declaration

I, **Adegoke Oluwapelumi Familola** hereby declare that the Master thesis entitled "**Women Empowerment in Agriculture and Household Hunger: Evidence from Bangladesh and Uganda**" submitted to GLODEP Consortium 2022 as a thesis graduation requirement under the guidance and supervision of Professor Maria Sassi, University of Pavia, is my original work and any theoretical and empirical literature, as well as the dataset used in the proceedings of the study, have been duly cited and referenced.

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Adegoke Oluwapelumi Familola.

31st May 2022

Acknowledgments

I would like to express my gratitude to my supervisor Professor Maria Sassi. I am immensely thankful for your trust, your patience, and your professional guidance and advice throughout my stay at the University of Pavia, Italy. Your feedback and comments were significant to me and helped shape the research that culminated in this thesis.

I am extremely grateful to the European Commission for funding this wonderful master's program. My gratitude goes to the GLODEP staff for their unflinching support from the beginning of this program to where we are today. Special thanks to my cohorts for their encouragement and timely information about this thesis. Thank you Eniololade and Adeniran for your friendship, it is dear to my heart. I am also grateful to Mrs. Gbemisola for her assistance in my work.

Finally, I would like to thank my family who has been my backbone throughout my studies without whom I would not have made it this far. Most importantly, I thank God for his protection over me throughout my journey in life.

ABSTRACT

Women empowerment and food insecurity remain key development issues in developing countries. This study assessed the empowerment status of women and household hunger using the Women Empowerment in Agriculture Index (WEAI) pilot II datasets for Bangladesh and Uganda. Further, the study also identifies the individual and household characteristics that influence women's empowerment. The WEAI analysis results shows that most women do not have adequate achievements in at least four of the five domains of empowerment in both countries (both percentages were nearly similar when segregated by gender). The Household Hunger Scale shows that most of the household had little to no hunger women and men who are not empowered in agriculture are significantly associated with moderate hunger scores. Based on these findings, the study suggests that tackling disempowerment in agriculture is a potential avenue for addressing the issue of hunger and food security. Also, there is a need to show a strong disposition to promote gender equality and women's empowerment by public institutions, policymakers, the community, as well as private institutions.

Keywords: WEAI, Gender Equality, and Household Hunger.

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List of Abbreviations

AJK	Azad Jammu and Kasmir
A-WEAI	Abbreviated Women's Empowerment Agricultural Index
BIHS	Bangladesh Integrated Household Survey
BMI	Body Mass Index
CWEI	Cumulative Women Empowerment Index
DHS	Demographic Health Survey
5DE	Five Domains of Empowerment
ELCSA	Latin American and Caribbean Food Security Scale
FAO	Food and Agriculture Organization of the United Nations
FEMI	Female Empowerment Index
FIES	Food Insecurity Experience Scale
FTF	Feed the Future
GAAP2	Gender, Agriculture and Asset Program
GDI	Gender Development Index
GEM	Gender Empowerment Measure
GGI	Global Gender Gap Index
GII	Gender Inequality Index
GPI	Gender Parity Index
HAZ	Height-for-Age Z-Score
HDI	Human Development Index
HFIAS	Household Food Insecurity Access Scale
HHS	Household Hunger Scale
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
LMIC	Low Middle-Income Countries
MDG	Millennium Development Goals

MPI	Multidimensional Poverty
OECD	Organization for Economic Co-operation and Development
OPHI	Oxford Policy and Human Development Initiative
PLS-SEM	Partial Least Squares Structural Equation Model
pro-WEAI	Project-Level-Women Empowerment in Agriculture Index
R-WEAI	Reduced-Women Empowerment in Agriculture Index
SDG	Sustainable Development Goals
SIGI	Social Institutions and Gender Index
SWER	Survey-based Women emPOwERment
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Funds
UN	United Nations
USAID	United States Agency for International Development
WEAI	Women Empowerment in Agriculture Index
WEAI4VC	Women Empowerment in Agriculture Index for Value Chain
WEF	World Economic Forum
WEI	Hunger Project Empowerment Index
WHO	World Health Organization

UNIVERZITA PALACKÉHO V OLOMOUCI

Přírodovědecká fakulta

Akademický rok: 2021/2022

ZADÁNÍ DIPLOMOVÉ PRÁCE

(projektu, uměleckého díla, uměleckého výkonu)

Jméno a příjmení:	**Adegoke FAMILOLA, BA (Hons)**
Osobní číslo:	**R200678**
Studijní program:	**N0588A330003 Development Studies and Foresight**
Specializace:	**Development Studies and Foresight – specialization in Global Development Policy**
Téma práce:	**Women Empowerment in Agriculture in Sub-Saharan Africa**
Zadávající katedra:	**Katedra rozvojových a environmentálních studií**

Zásady pro vypracování

Agriculture is very significant to the local and regional economies of Sub-Saharan Africa. It is the main dominant livelihood activity which serve as a basis for food security and employment opportunities especially for the women. The participation of women in agriculture is increasing globally (World Bank 2016), with women working as farmers, unpaid workers on family farms as well as laborers in other agricultural enterprises (FAO 2011). According to several studies, female farmers have lower rates of agricultural productivity in comparison to male farmers. This is attributed to the fact that women especially in the rural settings experience inequitable access to agricultural inputs, services, information, and infrastructure they need to be productive in their activities. Moving beyond this, rural women farmers are exposed to various climatic factors such as drought which affect their production negatively and this make it easy for them to bear the grunt of the unfortunate scenario. Also, women suffer from gender discrimination and inequalities in agriculture. Therefore, there is a need to empower women's access to agricultural inputs, services, and infrastructure. This research will focus on the analysis of empowerment mechanisms for women as well as balancing gender gap in agricultural productivity across Sub-Saharan Africa. and infrastructure. This research will focus on the analysis of empowerment mechanisms for women as well as balancing gender gap in agricultural productivity across Sub-Saharan Africa. and infrastructure. This research will focus on the analysis of empowerment mechanisms for women as well as balancing gender gap in agricultural productivity across Sub-Saharan Africa.

Rozsah pracovní zprávy:	**10 -15 000 slov**
Rozsah grafických prací:	**dle potřeby**
Forma zpracování diplomové práce:	**tištěná/elektronická**
Jazyk zpracování:	**Angličtina**

Seznam doporučené literatury:

FAO, 2011. The State of Food and Agriculture: 2010-2011: Women in Agriculture. Closing the Gender Gap for Development.
World Bank, 2016. Feminization of agriculture in the context of rural transformations: what is the evidence? https://doi.org/10.1596/25099.

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University of Pavia

Datum zadání diplomové práce: **21. ledna 2022**
Termín odevzdání diplomové práce: **30. května 2022**

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CHAPTER ONE: INTRODUCTION

This chapter gives details of the background (Section 1.1), problem statement (Section 1.2), and the purpose of this study (Section 1.3). Section 1.4 highlights the justification of the present study. Section 1.5 scope and limitations of the study and finally Section 1.6 describes the organization of the study

1.1 Background Information

The Sustainable Development Goal (SDG) 5 (achieving gender equality and empowering all women and girls) is vital to improving the welfare of all people (United Nations, 2015). The key targets of this goal include ending all forms of discrimination against all women and girls, recognizing and valuing unpaid care and domestic work through the provision of public services, ensuring women's full and effective participation and equal opportunities for leadership at all levels of decision making, undertaking reforms to give women equal rights and access to economic resources, and enhancing the use of enabling technology to promote women's empowerment (United Nations, 2015). This goal is linked with other SDGs such as eliminating poverty (SDG 1), achieving zero hunger and malnutrition (SDG 2), decent work and economic growth (SDG 8), and good health and well-being for women and children (SDG 3) (Huh, 2018; Kazembe, 2020; Cunningham et al., 2015; Heckert, Olney, & Ruel, 2019; Malapit, Kadiyala, Quisumbing, Cunningham, & Tyagi, 2015; Ruel, Quisumbing, & Balagamwala, 2018; Sraboni, Malapit, Quisumbing, & Ahmed, 2014). For instance, access to productive, financial, and human capital resources by the women can increase agricultural production and thereby achieve food security. Also, alleviating poverty and hunger can translate into having equal access for women to basic infrastructure facilities thereby leading to greater economic activity (Kazembe, 2020). However, a clear understanding and measurement of women empowerment and gender equality are very significant.

Women's empowerment is the process of empowering women (Kabeer, 2005). It means increasing the personal, social, economic, and political strength of individuals and communities. People are empowered when have increased access to and control over resources and actions to transform the

structure and institutions which strengthen and perpetuate gender discrimination and inequality (Nomoto, 2017). Women's empowerment is all about equipping and allowing women to make life-determining decisions through the different problems in society (Bayeh, 2016). On the hand, Gender equality implies that the interests, needs, and priorities of both women and men and girls and boys are taken into consideration, recognizing the diversity of different groups and that all human beings are free to develop their abilities and make choices without the limitations set by stereotypes and prejudices about gender roles. Gender equality is a matter of human rights and is considered a precondition for, and indicator of, sustainable people-centered development (Nomoto, 2017). Measuring women's empowerment exactly is very difficult because it is a multidimensional concept. thus, there are relatively few quantitative tools measuring gender equality and empowerment. There is a list of women empowerment indices that have been used to capture gender equality and empowerment across the globe (see Alkire & Ibrahim, 2007 and Buvinic et al., 2020) and includes the United Nations Development Programme's (UNDP) Gender Development Index (GDI), the Global Gender Gap Index, the Social Institutions and Gender Index (SIGI), the UNDP's Gender Empowerment Measure (GEM), Gender Inequality Index (GII), Human Development Index (HDI), and Multidimensional Poverty Index (MPI) (UNDP, 2018). Out of these indices, the Women Empowerment in Agriculture Index (WEAI) is the first index to directly measure women's empowerment and inclusion levels in the agricultural sector (IFPRI, 2012).

Empowering women and achieving gender equality are vital keys to development policy which have been shown to improve agricultural productivity in developing countries. For example, according to the Food and Agriculture Organization of the United Nations (FAO) (2011), "closing the gender gap in agriculture is essential to increasing agricultural productivity, achieving food security, and reducing hunger." The World Bank (2012) also emphasizes the significant role of women's empowerment on the efficiency and welfare outcomes of policy interventions. The participation of women in agriculture is increasing globally (World Bank 2016), with women working as farmers, unpaid workers on family farms as well as laborers in other agricultural enterprises (FAO 2011). According to several studies, female farmers have lower rates of agricultural productivity in comparison to male farmers (Asadullah & Kambhampati, 2021). This is attributed to the fact that women especially in the rural settings experience inequitable access to agricultural inputs, services, information, and infrastructure they need to be productive in their

activities. Moreover, both rural male and female farmers are exposed to various climatic factors such as drought which affect their production negatively and this makes them vulnerable, but the females suffer the most from gender discrimination and inequalities in agriculture. This is because of social and cultural taboos prevailing mostly in developing countries such as Sub-Saharan Africa and some parts of Asia. For example, women can decide on the farm but are discouraged to engage in markets and public spheres (Holmelin, 2019). Therefore, there is a need to empower women's access to agricultural inputs, services, and infrastructure.

1.2 Problem Statement

It has been agreed within the global development community that gender equality and women's empowerment are crucial goals from the perspective of human rights, as well as for achieving a range of economic and social development objectives such as improved food security, child nutrition, and education, and women's health (Johnson et al., 2018). The importance of gender and the empowerment of women cannot be overemphasized. Several organizations have incorporated empowerment objectives and integrated activities designed to empower women in their agricultural projects and programs (Quisumbing et al., 2022). Nevertheless, there have been difficulties in tracking the progress of these objectives because few measures are available to explicitly quantify both gender equality and women's empowerment. There are several indicators at the national and international levels that measure gender equality and do not measure women's empowerment directly. For example, the Gender Gap Index (World Economic Forum (2018) and previous years), the Gender Development Index (GDI), and the Gender Inequality Index (GII) (UNDP, 2018) which rely on aggregate data have focused on gender equality, rather than women's empowerment (A. Quisumbing et al., 2022). Similarly, the Organization for Economic Co-operation and Development's (OECD) Social Institutions and Gender Index (SIGI) is a measure of gender equality that focuses on five legal and social institutions and is used to rank countries. The indicators proposed for tracking MDG 3 (ratios of girls to boys in primary, secondary, and tertiary education; the share of women in wage employment in the non-agricultural sector; and the proportion of seats held by women in national parliament), are useful for characterizing progress toward gender equality, but, as proxy indicators, do not provide direct measures of individual

empowerment outcomes[1] Food security depends upon the agriculture sector and is regarded as the principal source of household nutrients and income (Aziz et al., 2021) and agriculture is the economic backbone and key factor of food security for rural households (Srinita, 2015; Baiphethi and Jacobs, 2009), but one of the main challenges in achieving food security are women's substandard empowerment in the agriculture sector. Women in rural areas face certain obstacles such as educational access, employment, and most importantly, access & ownership of productive resources such as land, livestock, etc. (Achandi et al., 2018; Boone, 2015; Bayissa et al., 2018; Chimhowu, 2019; Chigbu, 2019; Dzanku, 2019; Ibnouf, 2011; Kieran et al., 2015; Ondetti, 2016). Stevano (2017), in sub-Saharan Africa, identified that women farmers are subjected to disparities, especially in access and control over the farmland, agricultural inputs, credit, extension services, autonomy, and decision-making of farming activities.

1.3 Purpose of the Study

The concept of women's empowerment and food security are vital aspects of agricultural development. This study aims to establish the relationship between household hunger and women empowerment relating to an agricultural context in Bangladesh and Uganda. Using the Household Hunger Scale and Women Empowerment in Agriculture Index, the study aims to measure household hunger and women empowerment respectively.

Specifically, this study aims to address the following research objectives:

1. To assess the status of women's empowerment in agriculture across the five domains (production, resources, income, leadership, and time) in Bangladesh and Uganda.
2. To describe the level of household hunger in Bangladesh and Uganda.
3. To establish the relationship between household hunger and women's empowerment status in Bangladesh and Uganda.

1.4 Justification of the Study

[1] See http://mdgs.un.org/unsd/mdg/host.aspx?Content=indicators/officiallist.htm for a list of official MDG indicators

Generally, the measurement of women's empowerment is fraught with difficulties due to its multidimensionality. As stated by Mason (1986) that the phenomenon of gender inequality is inherently complex and spreads across different dimensions including the social, economic, and political dimensions among others. Thus, various indices capture and measure women's empowerment but existing tools for measuring the impact of agricultural interventions on women's empowerment are limited (Alkire et al., 2013). Given this context, this study adopts an innovative and robust tool called WEAI that captures and measures the empowerment of women in rural agricultural households. The use of this tool is relevant in this study because it is a multidimensional measurement tool that is reported at the country/regional level and is based on individual data collected by interviewing both male and female household decision-makers. In comparison to the previous research, proxy indicators or a single aspect of empowerment were used (Grepin & Bharadwaj, 2015; Osamor & Grady, 2016; Musonera & Heshmati, 2016; Ayevbuomwan et al., 2016). This tool will contribute to advancing agricultural development in developing countries since the focus areas of this study are Bangladesh and Uganda.

Furthermore, Alkire et al., (2013) presented the first pilot findings from Bangladesh, Guatemala, and Uganda. It was revealed that there is a lot of error in the datasets being the first data that was collected to develop the WEAI. For example, the autonomy module was not included in the first piloted data. However, this study consolidates on the previous study by employing the IFPRI 2015 second pilot datasets in the context of Bangladesh and Uganda and serves as a relevant complement to the existing datasets. There is a growing body of literature examining the relationship between women's empowerment, food security, and nutrition. Several studies have explored the relationship between women empowerment, household hunger, dietary diversity, per capita calorie availability, adult body mass index, nutritional outcomes, and Household Food Insecurity Access Scale (HFIAS) using primary data at the national and regional level (Komatsu et al., 2018; Quisumbing and Malapit, 2015; Quisumbing et al., 2013; Sraboni and Quisumbing, 2018; Sraboni et al., 2014; Quisumbing et al., 2021; Aziz et al., 2021; Bohis-Profumo et al., 2021; Asadullah and Kambhampati, 2021). In comparison to this literature, this study used Household Hunger Scale (HHS) as a measure of food security because it is relatively user-friendly, cost-effective, and easy to collect, and most importantly, it measures the level of food deprivation at the household level rather than at the national level. To the best of my knowledge, this will enable policymakers to design programs and interventions that will eradicate hunger at the household level.

1.5 Scope and Limitations of the Study

This study employed the second pilot datasets that were fielded between August and September 2014 in the Barguna, Jessore, Khulna Madaripur, and Patuakhali districts of Bangladesh, and the Amuru, Kole, Luwero, Masaka, and Igang districts of Uganda. The dataset is a mixture of both qualitative and quantitative data that fits into the WEAI module. There are two limitations of this study. First, this study used a pilot data survey with limited sample size and is not representative of the full USAID Feed the Future zones of influence. In other words, pilot datasets were used instead of the actual baseline and mid-line surveys. This is because most datasets that are available are outdated and have been exploited. Also, due to the time constraint and lack of resources, primary data will have been the best option but unfortunately, it is impossible to use it. The second one is that the qualitative aspect of the datasets was not employed because it only addresses a few people.

1.6 Outline of the study

This study comprises 5 chapters, the first chapter includes the background information of the study. The second chapter discusses the literature review (conceptual, theories, and empirical evidence) employed in this study. The third chapter explains the methodology of this study (data sources that were used, how data was collected, and the analytical techniques that were used in analyzing the data). It also includes how the WEAI was constructed. The fourth chapter presents the discussion and findings of each of the research questions. The final chapter of the study is the conclusion and recommendation.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter will provide an insight into the multidimensional nature of women's empowerment in agriculture and its significance in the context of food security. It will begin by highlighting the concepts and theories (conceptual and theoretical framework) of women empowerment and then explains the framework underpinning the objectives of this study. The chapter also reviews the development of WEAI to date in the FTF countries were also presented. Finally, several empirical reviews were done to explain the influence of individual and household characteristics on women's empowerment, the 5DE of empowerment, and the relationship between household hunger and empowerment. The rationale for the choice of the methodology adopted for this study was also presented. The literature review was obtained from various sources, including working papers, research reports, dissertations, government publications, and theses; accessed through the IFPRI website, books, journals, and the internet.

2.2 Definitions of Women's Empowerment

The definitions of empowerment in the literature are vast (Shaw,1994; Kabeer,1999; Moss, 2002; Mocedale, 2005; Alkire et al., 2013; Allsopp and Tallontire,2014; Kishor and Subaiya (2008); Goldman and Little, 2014; Ibrahim & Alkire, 2007). The most common definitions that are cited can be found in the works of Kabeer (2001), Alsop, Bertelsen, and Holland (2006), Narayan-Parker (2005), and Alkire et al. (2013). These are the authors of theories underpinning how women empowerment indicators were constructed and developed, especially the WEAI. Kabeer (2001) defined empowerment as expanding people's ability to make strategic life choices, particularly in contexts where Alsop et al. (2006, p10) described empowerment as "a group's or individual's capacity to make effective choices, that is, to make choices and then to transform those choices into desired actions and outcomes". These definitions encompass two main components: the concept of agency and the institutional environment. The first component was determined by Sen (this ability had been denied1987) and defined as the ability to act on behalf of what you value and

have reason to value and the second component offers people the ability to exert agency fruitfully (Alkire et al., 2013; Alkire & Foster, 2011; Ibrahim & Alkire, 2007).

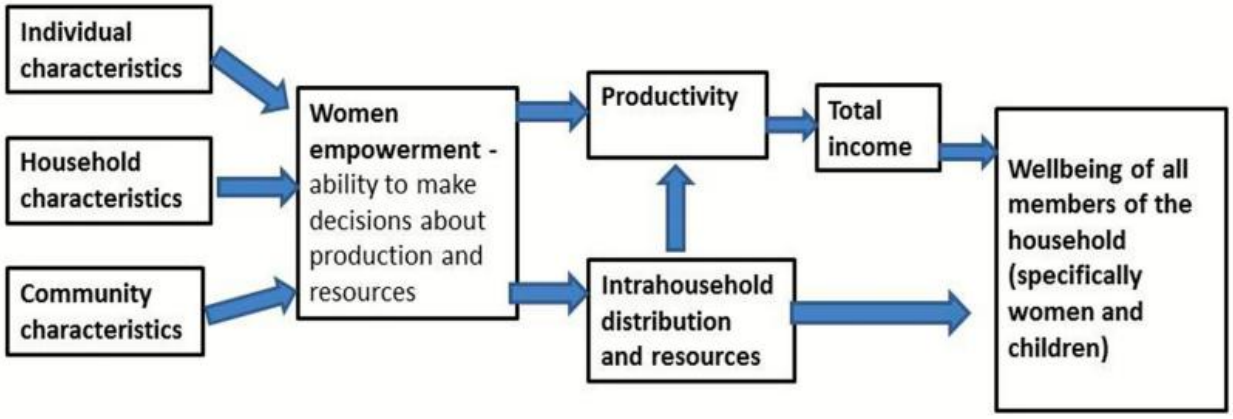
In general, empowerment, as well as women's empowerment, is a multidimensional concept. According to Mason (1986), the phenomenon of gender inequality is inherently complex and spreads across different dimensions including the social, economic, and political dimensions among others. Disempowerment among men and women varies in one dimension or the other and it also changes across the different aspects of life. If intervention takes place in one dimension, empowerment in other dimensions should not be disregarded because all the dimensions must equally meet their targets in a holistic manner (Sandra, 2020). The World Bank defines empowerment as: "the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control, and hold accountable institutions that affects their lives" (Narayan 2002), also adopted this multidimensional aspect of the disempowerment concept. Empowerment was also defined by Mason and Smith (2003) as a multidimensional process that enables individuals to meet both their practical and strategic needs and increases individual political power, and self-consciousness and strengthens self-confidence. It can be deduced that the concept of empowerment cannot be overemphasized, for this study, the subsequent sections will focus on women's empowerment in agriculture.

2.3 Conceptual Framework of Women Empowerment

Two recent frameworks explain the concept of women's empowerment which specifically address the empowerment at the individual, household, and community levels. The first one was proposed by Yount, (2017) which described women's empowerment at individual and community levels. This framework is relevant to LMICs where some norms and attitudes limit women's welfare. He conceptualized women's empowerment based on the works of Kabeer (1999) and Mosedale (2005). The second one was proposed by Sell & Minot (2018), which describes women's empowerment at the individual, household, and community levels. This framework is relevant to the methodology adopted for this study as opposed to the former one because it incorporates both individual and household characteristics that can influence empowerment. Ideologically, the framework explains that women's empowerment is influenced by a combination of individual, household, and community characteristics. Empowerment, in turn, can have an important impact on productivity and resource use, which according to literature may affect the overall wellbeing of

the household, particularly that of women and children. Figure 1 presents the framework used in this study. Access to resources and input into decision-making are both key components of women's empowerment. On the one hand, they will influence productivity directly; on the other hand, they may influence the intra-household distribution and resource allocation, which in turn will also affect productivity. Productivity, in turn, affects the total income of the household, which has a great influence on the overall household wellbeing. But intra-household distribution and resource allocation also have a direct impact on the well-being of individual members, such as women and children. In this study, we focus on how a range of individual and household characteristics influence women's empowerment status. By identifying the central characteristics associated with women's empowerment, we can better understand the key constraint to women's empowerment and how it may be linked to other aspects of well-being, including income-generating opportunities, access to inputs, and education. The pilot data do not include information on community characteristics, this suggests further studies. As stated by the author of this framework, the area of further research should include the effect of women's empowerment on household outcomes such as income, health, and nutrition (Sell & Minot, 2018).

Figure 1: Conceptual Framework of Women's Empowerment



Source: (Sell & Minot, 2018).

2.4 Measurement of Women's Empowerment

To better understand the concept of women's empowerment deeply, it is important to know the methodology behind its measurement. Therefore, its measurement empowerment is relevant to establishing the relationship between women empowerment and various vital human development indicators as well as for monitoring the agricultural development projects. It can help to keep track of areas of disempowerment that women are facing in a rural setting (Sandra, 2020). Also, if women's empowerment is being measured, it becomes easier to think through more concretely and addresses the problem of empowerment more effectively (Penn 2015). The authors of indices that measure women's empowerment are challenged to answer questions such as which are the indicators of empowerment, or which indicators can be used to track its progress? How can we measure women's empowerment in a way that allows the expected heterogeneities between regions, socioeconomic status, marital status, age, or ethnicities? Before the development of WEAI, all indicators were proxies or indirect indicators and thus did not provide direct measures of empowerment as experienced by individuals.

2.4.1 A Sequential Review of Women's Empowerment Indices

According to the literature, there are many ways to measure empowerment both at the micro and macro levels and across the state, market, and social domains, Alkire & Ibrahim, (2007) and Buvinic et al., (2020) have more comprehensive details on this. Various proxy variables have been used to measure women's empowerment such as education and income, the ratio of girls to boys in primary, secondary, and tertiary education, the proportion of seats held by women in the national parliament, and the share of women in wage employment in the non-agricultural sector. The Gender Development Index (GDI) together with the Gender Empowerment Measure (GEM) was one of the early measurements that were introduced in 1995 in the Human Development Report written by the United Nations Development Programme (UNDP).

The GEM was designed to measure gender equality. It measures "whether women and men can actively participate in economic and political life and take part in decision making" (UNDP, 1995, Klasen, 2006). The GEM is determined using three basic indicators: proportion of seats held by women in national parliaments, percentage of women in economic decision-making positions (administrative, managerial, professional, and technical occupations), and female share of income

(Charmes and Wieringa, 2003). Despite the significance of this index for designing policies, it only considers a small group of women in society (Bardhan 1999). It measures only the people that are in high political positions or belong to some elite group. This index does not provide an exact measurement of empowerment because it neglects most women in poor and developing countries. The GDI is a "distribution-sensitive measure that accounts for the human development impact of existing gender gaps in the three components of the Human Development Index (HDI)" (Klasen 2006). The GDI uses the same indicators of the HDI, namely income, life expectancy, and education and therefore it is a sub-index of the HDI. Consequently, it is not an independent measure of gender gaps, and can only be used with the scores from the HDI. GDI cannot be used on its own as a measure of gender gaps which means it is a dependent indicator. Another issue of GDI that was noted by Bardahn (1999), some data on life expectancy are difficult to calculate in the absence of complete vital registration systems life expectancy is very sensitive to the often-underreported number of infant deaths. Since the creation of these two indices, much debate has arisen over whether GEM and HDI have been influential in promoting gender-sensitive development. The criticisms of these indices include 1) Methodologically, the weakness is that these indices use aggregate data and thus cannot be broken down by age, region, or other social groups, 2) difficulties in interpretation and suffer from large data gaps, 3) they do not provide exact comparisons across countries, and 4) many development factors are combined into a single measure and this makes it complex to interpret sometimes (Alkire et al., 2013).

The Gender Parity Index (GPI) is another alternative index that was released by UNESCO for measuring women's empowerment. It is a socio-economic index that measures the gender differences in the education of males and females. A GPI value of one indicates equality between males and females. A GPI value less than one indicates parity in favor of males, while a GPI value greater than one indicates parity in favor of females. It is calculated as the quotient of the number of females by the number of males enrolled in each stage of education (primary, secondary, etc.) (Klasen and Schüler 2011). This index has been used by global organizations to track the advancement of developing countries as well as to design policies that aim at ensuring inclusive and equitable quality education at all levels of school education. Nevertheless, there are still some loopholes as regards its measure of women's empowerment. One of the major limitations of the index is that it places too much emphasis on education and neglects other development factors. (Alkire et al., 2013). However, bridging social and gender gaps in education is elemental to raising

levels of empowerment, it should not be the only measure of empowerment but should take into consideration domains like health, economic, social, and political participation.

The Cumulative Women Empowerment Index (CWEI) is another multidimensional measure of empowerment that was developed in 2005 by Parveen and Leonhäuser. This index was constructed by six dimensions: decision making, social-cultural mobility, family/interpersonal empowerment, economic empowerment, political empowerment, and psychological empowerment. It is a combination of both quantitative and qualitative data to get a comprehensive view of women's empowerment. The limitation of this index is that it does not allow for heterogeneities between different groups such as sectorial (agricultural sector and non-agricultural sector), ethnic, generational, socioeconomic, or regional (Sandra, 2020). The UNDP also developed a new index in 2010 in an attempt to reform the GDI and GEM due to the failure to capture the disparities faced by women. The Gender Inequality Index (GII) is the new composite index introduced to rectify the failures of the previous indicators. GII is a composite index that provides insights into gender differences in health, empowerment, and the labor market (UNDP, 2010). One of the criticisms is that it does not capture the time women spend in unpaid labor (Klasen and Schuler, 2011). Also, both Klasen and Schuler, as well as Permanyer, argue that GII includes unnecessary dimensions that made it difficult for analysts, policymakers, and development practitioners to get better results. Therefore, the GII lacks regional relevance and is very difficult to understand (Permanyer 2011, Klasen and Schuler, 2011). Other indicators for measuring empowerment are the Hunger Project Empowerment Index (WEI), the Female Empowerment Index (FEMI), the OECD Development Centre's Social Institutions and Gender Index (SIGI), and so on (see Buvinic et al., 2020 for more details). All these indicators measure empowerment at the macro-level and do not accurately capture household and individual levels of empowerment. Hence, the next paragraph explains in detail the need for more narrow measures of empowerment to understand household gender dynamics.

Other approaches for measuring empowerment are cross-country standardized and nationally representative surveys, which include the Multiple Indicator Cluster Surveys (UNICEF, 2000) and the Demographic and Health Surveys (DHS, 2008). These surveys include a range of questions that analyze women's empowerment indicators (including women's participation in decision-making, access to education and other socioeconomic indicators, attitude and perception of

domestic violence, and asset ownership). Most importantly, to estimate the level, trends, determinants, and effects of women's empowerment and key welfare indicators effects of women empowerment and key welfare indicators (Grépin & Bharadwaj, 2015; Osamor & Grady, 2016; Musonera & Heshmati, 2016; Alsop et al. 2006; Ayevbuomwan et al., 2016). DHS measures empowerment directly within the household (i.e., it confines the decision-making to the household and domestic domain) (Sandra, 2020). The limitation of this survey is that it does not capture other dimensions of a woman's life as regards the production and economic domains. Also, it only covers dimensions other than intra-household allocation of decision-making powers (Alkire 2005; Narayan-Parker 2005). Women empowerment is broader than limiting to some particular domain or the others. Malhotra and Shurley (2005), said that the advancement of women's empowerment is not frequently monitored over time and the context-specific nature of their empowerment is a problem in terms of consistency and comparability in the indicators used across social settings. Nevertheless, there is a progress in evaluations and research over the years using different indicators and measures to better understand how women's empowerment and agency direct women's participation in economic activities and access to services (like finance, nutrition, security, and healthcare) across the household and the community levels (Alkire et al., 2013; Amin & Becker, 1998; Sraboni & Quisumbing, 2018; Ewerling et al., 2017; Malapit et al., 2020; Galiè, Teufel, Korir, et al., 2019; Quisumbing et al., 2021; Lemke et al., 2003; R. S. Meinzen-Dick et al., 2017; Sell & Minot, 2018; Vaz et al., 2016). These measures have been used to examine correlations and associations between women's empowerment and key indicators such as food security, health, and economic outcomes. In addition, these measures also focused on various dimensions, including production decision-making, productive resources, control over income, leadership, and time allocation. The Women Empowerment in Agriculture Index (WEAI) (Alkire et al., 2013) and the Survey-based Women's emPowERment (SWPER) index for women's empowerment in Africa (Ewerling et al., 2017)were the two measures created to overcome the criticisms and failure of previous indices mentioned in this chapter. In 2011, the WEAI was first piloted in three countries (Bangladesh, Uganda, and Guatemala) and four organizations. The pilot survey was fielded from September to November 2011 (Alkire et al., 2013). The WEAI was launched in 2012 by the U.S. government's Feed the Future initiative (FTF) as a monitoring and evaluation tool to capture women's empowerment and inclusion levels in the agricultural sector (IFPRI, 2012). The WEAI has five domains and 10 indicators, and this tool has been implemented in baseline studies across

21 FTF countries and 4 organizations. The index is specifically designed to measure empowerment in agriculture, and it considers women as economic agents that participated in activities both inside and outside the household. The advantages of the index include 1) It is easier to interpret, and its results can be compared across various countries, 2) it covers a broader population of people including men and women in rural and urban areas, and 3) it is used to identify key areas of empowerment lacking by men and women so that intervention/policies can be developed and implemented in such areas. The second pilot datasets consist of the original WEAI (first pilot datasets) and the revised versions which are 1) the original version of WEAI called WEAI 1.1, and 2) the Abbreviated WEAI 1.1 (A-WEAI), 3) a revised version called WEAI 2.0, and 4) A-WEAI 2.0. The A-WEAI was launched in 2015 in a bid to shorten interview length and modify questions that were difficult to implement in the field. It retains the five domains of empowerment but consists of only six indicators and has been used in 26 countries and 41 organizations. In 2016, the development of a project-level WEAI (Pro-WEAI) began at the Gender, Agriculture and Asset Program (GAAP2), and a project called Agriculture, Nutrition, and Gender Linkages was launched in Bangladesh. This project aims to evaluate the impact of agricultural production, nutrition knowledge, and gender sensitization for promoting gender-sensitive agriculture and women empowerment. It was implemented in 39 countries and 78 organizations. In 2017, Pro-WEAI was piloted in 9 countries by 13 projects, and WEAI4VC was piloted in Bangladesh and the Philippines and implemented in 47 countries and 91 organizations. Finally, the pro-WEAI index was launched in April 2018. The pro-WEAI measures women's empowerment in various types of agricultural projects. This index was based on the concept of empowerment as a process (Kabeer 1999) and is made up of 12 indicators that measure three types of agency: intrinsic agency (power within), instrumental agency (power to), and collective agency (power with) (Malapit et al. 2019). The limitation of all the WEAI versions is as follows: 1) its usability is only restricted to women engaging in only agricultural activities in rural areas. 2) WEAI results may not be representative of the empowerment of all adult women in a country, because respondents in the WEAI survey are primary decision-makers and may be more empowered than other women in their households, 3) women who are not involved in agricultural decisions may appear disempowered even if they are engaged in decision-making on nonagricultural activities, 4) women in households that do not have a male decisionmaker are likely to be identified as empowered because of the WEAI's focus on decision-making questions, 5) other domains of empowerment not captured in the WEAI, which

focuses solely on agriculture, may be more relevant to specific desired outcomes, such as nutritional status. For this study, the WEAI was used, and the following section gives a detailed explanation of its methodology.

2.4.2 The Women Empowerment in Agriculture Index (WEAI)

The WEAI was created in February 2012 by the International Food Policy Research Institute (IFPRI), the US Government's Feed the Future initiative of the United States Agency for International Development (USAID), and the Oxford Poverty and Human Development Initiative (OPHI) of Oxford University. The WEAI is an aggregate index, reported at the country or regional level, based on individual-level data collected by interviewing men and women within the same households. It consists of two sub-indices. The first sub-index evaluates the degree to which respondents are empowered in five domains of empowerment (5DE) in agriculture. It reflects the percentage of empowered women and men and, among those who are not, the percentage of domains in which they enjoy adequate achievements. These domains are decisions about agricultural production, access to and decision-making power about productive resources, control of the use of income, leadership in the community, and time allocation. The second sub-index is called the Gender Parity Index (GPI), which measures gender parity. The GPI reflects the percentage of women who are empowered or whose achievements are at least as high as the men in their households. For those households that have not achieved gender parity, the GPI shows the empowerment gap that needs to be closed for women to reach the same level of empowerment as men in their households.

2.4.2.1 Definition of WEAI Domains and its Indicators

The Five Domain Empowerment Index (5DE) is based on the Alkire-Foster methodology (Alkire & Foster 2007), and it constructs an empowerment score for each woman. The score is a summation of the woman's level of achievement (adequate or inadequate) in ten indicators, and the higher the score the greater the woman's level of empowerment. The ten indicators are grouped into five different domains in the WEAI: production, resources, income, leadership, and time (Table 1), and weighted by arbitrary importance. The description and definitions of the domains and their indicators are based on (Alkire et al. 2013).

Table 1: Five Domains of Empowerment

Domain	Indicator	Definition of indicator	Weight
	Input decision in production	Sole or joint decision-making overland farming and livestock raising	1/10
Production	Autonomy in production	The degree to which women's motivation for making decisions reveals their values rather than a need to entertain others or get away from damage is reflected by autonomy	1/10
	Assets ownership	Sole or joint ownership of major household assets (land, livestock, etc.)	1/15
Resources	Purchase/sale/ transfer	Women's participation and input decisions in the purchase, sale, or transfer of land or other productive resources	1/15
	Access and control over credit	Participation and access to credit	1/15
Income	Power to use income	Sole or joint power to spend income	1/5
Leadership	Group membership	Whether women are dynamic members in at least one social or economic group	1/10
	Public speaking	Whether the respondent is at ease in speaking on issues related to herself or public	1/10
Time	Workload	Time investing in agricultural farming and domestic chores	1/10
	Time for leisure activities	Satisfaction with relaxation time	1/10

Source: (Alkire et al. 2013).

The first domain is production, and it relates to participation in agricultural decision-making. This domain consists of two indicators. The first one is the decisions on production outputs. If an individual makes these decisions independently or jointly, he or she is considered to be empowered. The second indicator relates to the extent to which an individual feels he or she can make his or her own decisions regarding production inputs. If an individual feels he or she can influence the decisions even to a small extent, he or she is considered to be empowered. Inputs into the following production decisions are included for the two indicators: (1) food crops grown for household consumption, (2) cash crops to be grown for sale in the market, (3) livestock to be

raised, (4) nonfarm activities to be undertaken, (5) inputs to buy for agriculture production, and (6) taking crops to the market. An individual is considered to be empowered in the production domain only if he or she is empowered in both of the above indicators.

The second domain, access to and control of productive resources are divided into three indicators. The first indicator examines whether an individual reports having sole or joint ownership of land and assets (including agricultural land, large and small livestock, fishponds, farm equipment, house, household durables, cell phone, nonagricultural land, and means of transportation). A person is considered to have adequate achievements if he or she reports having sole or joint ownership of at least one major asset (that is, not including poultry, nonmechanized equipment, or small consumer durables). The second indicator, defined with similar assets, asks who the person is who can make decisions regarding the purchase, sale, or transfer of land and assets. This recognizes that in many societies, full ownership of assets may not apply, but holding other bundles of rights—especially rights of control over the purchase and disposal of assets—can also be empowering. As with the first indicator, a person has adequacy in this area if he or she participates (or can participate) in decisions to buy, sell, or transfer the asset, conditional on the household's owning it. The third indicator examines decision-making about whether to obtain credit and how to use the proceeds from credit from various sources (nongovernmental organizations, formal and informal lenders, friends or relatives, rotating savings, and credit associations). To have adequacy on this indicator, a person must belong to a household that has access to credit (even if they did not use credit), and if the household used a source of credit, the person participated in at least one decision about it.

The income domain, which is a single indicator, measures sole or joint control over income and expenditures generated from food crops, cash crops, livestock production, nonfarm activities, wage and salary workers, and fish culture. This dimension assesses economic empowerment and the ability to increase economic resources. This domain is commonly covered by such nationally representative household surveys as DHS. The single indicator for this dimension measures the degree of input into decisions about the use of income generated from (1) food crops, (2) cash crops, (3) livestock production, (4) nonfarm activities, (5) wage and salary work, and (6) fish culture, as well as the extent to which the individual feels he or she can make his or her own decisions regarding wage or salary employment and major and minor household expenditures.9 A

person is considered adequate on this indicator if he or she has input into decisions about the income generated, conditional on participation in the activity.

The fourth domain is leadership, which measures membership in economic or social groups, and woman's comfort level for public speaking. The domain assesses the role of participation in collective actions like wage negotiation and presents some indication of the respondent's empowerment in exerting voice and engaging in collective action. The fourth domain comprises two indicators: (1) whether the person belongs to an economic or social group and (2) whether the person feels comfortable speaking out in public. Recognizing the value of social capital as a resource, the group member indicator shows whether the person is a member of at least one group, encompassing a wide range of social and economic groups.

The last domain, time, measure the allocation of time to productive and domestic tasks and satisfaction with available time for leisure activities. This indicator is derived from a detailed 24-hour time allocation module, and respondents are asked to recall the time spent on primary and secondary activities during the previous 24 hours.

2.5 Empirical Evidence of Literature

This section provides the evidence of literature on the WEAI, women empowerment and food security, and individual and household characteristics influencing women's empowerment status.

2.5.1 Empirical Literature on Women's Empowerment in Agriculture

According to Malapit et al., (2014), there is consistent and credible evidence that the status of women is improved, agricultural productivity increases, poverty is reduced, and nutrition improves, making the WEAI a crucial tool for monitoring progress towards these objectives. The evidence is as follows:

Ragsdale et al., (2018) used the baseline Women's Empowerment in Agriculture Index + Soybean Modules (WEAI+) to explore gender equity and agricultural empowerment among men and women smallholder farmers in Ghana's rural Northern Region. They found that most respondents lacked adequate empowerment in workload and over one-third lacked adequate empowerment in autonomy in production (both percentages were nearly identical when disaggregated by gender) across the ten WEAI indicators. Additionally, they used the 5DE score rather than the overall

WEAI score because of its equal proportion and found a significant gender difference in empowerment favoring men in the 5DE score. This implies that women were significantly less empowered than men in the 5DE scores. Further, they suggested that providing culturally embedded opportunities to strengthen women's access to agricultural inputs for better farm decision making, control over assets, active participation, and access to technical training are critical entry points to increasing agricultural empowerment among women smallholder farmers in Ghana's Northern Region.

(Sudeepkumar et al., 2021) employed the WEAI to estimate the level of women empowerment and factors contributing to women's empowerment among the 400 dairy farm women in Salem (North-Western) and Vellore district (North-Eastern zone) of Tamil Nadu in India. Their findings show that 26.75% of the dairy farm women were empowered and the empowerment index (5DE) was 0.6801. the intensity of disempowerment and disempowerment index were 0.4367 and 0.3199 respectively.

2.6 Empirical Evidence Linking Women's Empowerment and Food Security

There has been growing attention in the literature concerning the relationship between women's empowerment and household food security as well as child nutrition. The literature on this subject is many (Komatsu et al., 2018; Quisumbing and Malapit, 2015; Quisumbing et al., 2013; Sraboni et al., 2014; Quisumbing et al., 2021; Bohis-Profumo et al., 2021; Asadullah and Kambhampati, 2021; Zereyesus, 2017; Holland & Rammohan, 2019; Aziz et al., 2020, 2021; Kruse, 2019; Sraboni & Quisumbing, 2018; Bonis-Profumo et al., 2021). Among those specifically explored the linkage between women empowerment and household food security is as follows:

Sraboni et al., (2014) employed the first round of data of the 2012 Bangladesh Integrated Household Survey (BIHS) to examine the relationship between women's empowerment in agriculture, measured using the WEAI, and per capita calorie availability, dietary diversity, and adult body mass index (BMI). They found that at the household level, the increases in women's empowerment are positively associated with calorie availability and dietary diversity and that the elasticities are the largest for women's ability to participate and women's greater control of assets. They further suggested that the positive effect of the different dimensions of female empowerment

on food security outcomes is greater for smaller landowners, pointing to the potential positive redistributive effect of focusing women's empowerment efforts on poorer households.

Aziz et al., (2021) used a household survey data of 600 rural women quantified by the WEAI to explore its effect on household food insecurity in the northern part of Azad Jammu & Kashmir (AJK), Pakistan. Using the Partial Least Square model structural equation model (PLS-SEM), they found three empowerment outcomes; the rights of women (leadership domain), ownership of resources (agricultural production domain), and time spent on farming lands (time-domain) have significant negative effects on food insecurity. This implies that women can contribute to their household resilience when they have access to rights. Additionally, they found that women's empowerment in the income domain is positively significant with food insecurity, and this signifies that some non-economic mechanisms might be in operation in such a way it makes it difficult for women to control their households. These non-economic mechanisms include patriarchal customs, social norms, and taboos, and as a result of this, women are likely to spend less money on accessing food.

Holland & Rammohan, (2019) also used household survey data of over 6500 households from two waves of the Bangladesh Integrated Household Survey (BIHS) to analyze the five key empowerment indicators of the WEAI. They employed multivariate regression analysis to investigate the relationship between five key empowerment indicators and child stunting (a proxy for child food security). The outcome of their research shows that women's autonomy in household productive decisions and confidence in public speaking is associated with significantly higher children's height-for-age z-scores (HAZ) and a decreased probability of stunting. The total women's empowerment significantly improves households' dietary diversity. They suggested that increasing women's empowerment is likely to complement nutritional interventions to reduce stunting in Bangladesh while making progress towards other social and development goals.

In Timor-Leste, Bonis-Profumo et al., (2021) examined the empowerment of women in agriculture in association with household production and the dietary diversity of children 12–59 months old and their mothers. They used the A-WEAI to analyze 156 dual-adult rural households with multivariable regression models and found that the dietary diversity scores of empowered women and their children were higher than among those disempowered. The associations between different measures of empowerment and dietary diversity were larger and more significant among

women than children. Food production diversity was consistently associated with children's improved diets. They suggested that nutrition-sensitive policies and programs in Timor-Leste could gain from prioritizing women's empowerment and promoting agriculture diversification strategies as valuable investments to improve the diets and wellbeing of mothers and children.

The general overview is that there is a positive relationship between a strong position of women and food and nutrition security outcomes as highlighted above which means that there is a similarity in the literature. However, most of these studies used cross-sectional data and are conducted in South Asian and Sub-Saharan African countries.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The methodology adopted for this study was significant to the datasets used and played a vital role in the findings of the main research objective and the broad ones because it provides a means to measure women's empowerment in a manner that is relevant to agriculture The methodology employed was based on Alkire et al., (2013) because the main objective focused on measuring women's empowerment in Bangladesh and Uganda. Other objectives include capturing the level of hunger with the Household Hunger scale developed by the USAID FANTA-2 project. A discussion of the data sources used, and the analytical techniques employed for each research question are presented.

However, this chapter discusses the study setting in the present study in Section 3.1. Section 3.2 explains the data source and description.

3.2 Data Description

3.2.1 Source of Data

The study employed two different datasets for achieving the research objectives. The first one was IFPRI Women's Empowerment in Agriculture Index (WEAI) Pilot II datasets for Bangladesh (IFPRI, 2015). The second was IFPRI Women's Empowerment in Agriculture Index (WEAI) Pilot II datasets for Uganda (IFPRI, 2015) and both were fielded from August 2014 to September 2014. The dataset captured two key modules which are suitable for the study. Firstly, the individual-level module contains data on the five domains of women's empowerment (production, resources, income, leadership, and time. The last module contains data on household demographics, dwelling characteristics, employment and labor forces activities, land and agriculture, and consumption activities.

3.2.2 Sampling Design

A two-stage sampling procedure was used for the pilot survey. In Uganda, 5 parishes and 25 local council areas were selected from 5 preselected districts in two stages using PPS sampling, and 14 households were randomly selected from each local council (11 dual adults and 3 female adults only) for a total of 350 households (625 individuals). In Bangladesh, 5 villages were selected from each of the preselected rural districts using PPS, and 18 households were randomly selected from each village (14 dual adults and 4 female adults only) for a total of 450 households (800 individuals). The household selection was based on a two-page village census conducted before fieldwork. The districts of Khulna, Madaripur, Barguna, Patuakhali, and Jessore were selected in Bangladesh and for Uganda, the rural districts of Kole, Amuru, Masaka, and Iganga were selected (IFPRI, 2015). Because the survey aimed to produce empowerment measures for women, and for women to men in their households, the pilot sampled only female-only and dual-adult households (that is, those with male and female adults). The sampling strategy oversampled single-female households (approximately 20% of total samples) to obtain sufficient sample sizes for analysis.

3.3 Data Limitations

The total sample sizes employed for this study are not representative of the whole countries but rather reflect Feed the Future zones of influence or priority areas. Primary and secondary respondents are those who self-identify as the primary members responsible for decision-making, both social and economic, within the household. They are usually husband and wife; however, they can be other household members as long as there is one male and one female age 18 or older. For example, one might find a widowed mother and her adult son as the primary female and male respondents. It may also be the case that there is only one primary respondent if that person is female and there is no adult male present in the household. In the case that the WEAI is used to track empowerment over time, it will be important to make sure that this information is collected for the same member for follow-up surveys. As noted above, male-only households are possible, but rarely are found. Because of the focus on women's empowerment, they were excluded from the pilot.

3.4 Analytical Techniques

Data were analyzed using descriptive statistics, Women Empowerment in Agriculture Index (WEAI), and Household Hunger Scale (HHS. Also, the analysis of the dataset was captured using Microsoft Excel and STATA.

3.4.1 Women's Empowerment in Agriculture Index (WEAI)

The WEAI is composed of two subindexes: the first index measures the five domains of women empowerment (5DE), and the second index measures gender parity in empowerment within the household (GPI). The weights of the 5DE and GPI subindexes are 90 percent and 10 percent, respectively. The total WEAI score is the weighted sum of the country- or regional-level 5DE and GPI which is based on individual-level data on men and women within the same household (Alkire et al., 2013).

3.4.1.1 Five Domains of Empowerment (5DE) and its Construction

This 5DE subindex is used to assess whether women are empowered within their households across the five domains. According to Alkire et al., (2013), 5DE construction can be explained using two equal notations; the first one centers on the percentage of empowered women and adequacies among the disempowered while the second centers on the percentage of disempowered women and the percentage of domains in which they lack adequate achievements. Following the works of Alkire & Foster (2011), the second notation will be used for this study because it shows how disempowerment can be described and point out those who are not empowered. The computation of 5DE is as follows:

Identification of the disempowered

The first step is to code all adequacy in indicators so that they assume the values of 1 if an individual is inadequate in that indicator. The inadequacy score of each person is calculated by summing the weighted inadequacies experienced so that the inadequacy score for each person lies between 0 and 1. A person who has no inadequacy in any indicator receives a C_1 score equal to 0:

$C_1 = W_iI_i + W_2I_2 + W_3I_3 \ldots\ldots\ldots\ldots\ldots W_d\, I_d$ ----------(1)

where $I_i = 1$ if the person has an inadequate achievement in indicator i and $I_1 = 0$ otherwise, and W_1 is the weight attached to indicator i with $\sum_i^d = 1$, $W_i = 1$.

A second cut-off is used to identify the disempowered. The disempowerment cutoff is the share of weighted inadequacies an individual must have to be considered disempowered and is denoted by K. For all individuals whose inadequacy score is less than or equal to the cutoff, their scores are replaced by zero and any existing inadequacies are not considered in the censored headcounts. This step is called censoring of the scores. C_i denotes the non-censored score, and Ci (k) denotes the censored score. If $C_i > k$, then $C_i (k) = C_i$ and if $C_i \leq k$, then $C_i (k) = 0$. $C_i (k)$ is the inadequacy score of the disempowered.

Computation of the 5DE

The five domains of the disempowerment index are denoted by M_0 and it consists of two components--disempowered headcount which is the proportion or incidence of individuals within a given population whose share of weighted inadequacies is more than K and average disempowerment which is the intensity of their inadequacies. This explanation is based on the structure of the Adjusted Headcount measure of Alkire & Foster (2011).

Mathematically, the disempowered headcount (H_p).

$$H_p = \frac{q}{n} \quad \text{.....(2)}$$

Where q is the number of individuals who are disempowered, and n is the total population.

The average disempowerment is calculated as:

$$A_p = \sum_{i=1}^{n} \text{Ci}\ (k) \text{.....(3)}$$

where ci(k) is the censored inadequacy score of individual i and q is the number of disempowered individuals.

Calculating the Disempowerment Score for the Whole Population

$$M_0 = H_p \times A_p \text{.....(4)}$$

Finally, 5DE can be calculated as:

$5DE = 1-M_0$ ……(5)

Breaking Down M_0 by Domains and Indicators

M_0 can be decomposed into its component-censored indicators to show how people are disempowered. The censored headcount ratio for a particular indicator is obtained by adding up the number of disempowered people who are deprived of that indicator and dividing it by the total population. Once all the censored headcount ratios have been computed, it can be verified that the weighted sum of the censored headcount ratios also generates the country's M_0. It is computed as:

$M_{0\ country} = W_1CH_1 + W_2CH_2 + W_3CH_3 + \ldots\ldots\ldots W_{10}CH_{10}$ …… (6)

where W_1 is the weight of indicator 1 and CH_1 is the censored headcount ratio of indicator 1 and so on for all other nine indicators as:

$\sum_{i=1}^{d} Wi = 1.$ ……(7)

It is called censored because the inadequacies of women who are not identified as disempowered are not included to focus attention on disempowered women.

The percentage contribution of each indicator to overall disempowerment is computed as follows:

Contribution of indicator i to $M_0 = \frac{W1CH1}{M0\ country}$ X 100----------(8)

The contributions of all indicators will sum to 100 percent. Whenever the contribution to the disempowerment of a certain indicator greatly exceeds its weight, this suggests that there is a relatively high inadequacy in this indicator in the sample under analysis. The disempowered are more inadequate in this indicator than in others. Such indicators with high inadequacy point to areas for intervention to increase empowerment.

3.4.1.2 Gender Parity Index (GPI)

The GPI is a relative inequality measure that reflects the inequality in 5DE profiles between the primary adult male and female in each household. Households without a primary adult male are excluded from this measure, and thus the aggregate WEAI uses the mean GPI value of dual-adult households. To construct the GPI, the score of those whose inadequacy score is less than or equal to the disempowerment cut-off of k is replaced by the value of k, which is 20 percent. To

differentiate this censored inadequacy score from the censored score used to compute 5DE, we use the notation $c_i'(k)$ for the new censored inadequacy score. When $c_i > k$, then $c_i'(k) = c_i$, but if $c_i \leq k$, then $c_1'kk) = k$.

Each dual-adult household is classified on a gender parity basis. Households are considered to lack parity if the female is disempowered, and her censored disempowerment score is higher than the censored disempowerment score of her male counterpart. Put differently, a household enjoys parity if the woman is empowered or, if she is not empowered, her adequacy score is greater than or equal to that of the male in her household.

The GPI combines two key components: (1) the percentage of women who have not yet achieved empowerment or gender parity relative to their male counterparts (within a given population) and (2) the extent of the inequality between those women who lack parity and the men with whom they live.

The first component corresponds to the proportion of gender parity–inadequate households (H_{GPI}):

$$H_{GPI} = \frac{h}{m} \quad \text{.....(9)}$$

where h is the number of households classified as inadequate in gender parity and m is the total of dual-adult households in the population. The second component is called the average empowerment gap; it is the average percentage gap between the censored inadequacy scores of the women and men living in households that lack gender parity (I_{GPI}):

$$I_{GPI} = \frac{1}{h} \sum_{j=1}^{h} \frac{c_j^i\ (k^w) - c_j^i\ (k^m)}{1 - c_j^i\ (k^m)} \quad \text{..... (10)}$$

Where $c_j^i\ (k^w)\ and\ c_j^i\ (k^m)$ are the censored inadequacy scores of the primary woman and man, respectively, living in household j, and h is the number of households that are gender parity inadequate.

The GPI is calculated as:

$$GP1 = 1-(H_{GPI} \text{ x } I_{GPI}) \quad \text{.....(11)}$$

The GPI score can thus be improved by increasing the percentage of women who have gender parity (reducing H_{GPI}) or, for those women who are less empowered than men, by reducing the empowerment gap between the male and female of the same household (reducing I_{GPI}).

3.4.2 Household Hunger Scale (HHS)

A household hunger score (HHS), which measures the extent of household food deprivation, was computed following the methodology of the USAID FANTA-2 project (Ballard et al., 2011). Households are categorized into the following groups: little or no hunger, moderate hunger, and severe hunger. The HHS is used to observe the prevalence of hunger over time and across countries to inform policies and programming that address food insecurity and hunger. The Household Hunger Scale (HHS) is one of the four experience-based food insecurity scales included in the Data4Diets platform, which also contains the Latin American and Caribbean Food Security Scale (ELCSA), the Household Food Insecurity Access Scale (HFIAS), and the Food Insecurity Experience Scale ((FIES) | INDDEX Project, n.d.).

Two types of indicators can be used for HHS: a categorical HHS indicator and a median HHS score for the collected data. For this study, the first indicator will be used because it is easier to interpret and therefore is often preferred for informing program and policy design and monitoring and evaluation. To tabulate indicators, it is first necessary to compute an HHS score for every responding household. This requires some recoding of the data collected. The construction is as follows:

Step 1. The first step is to recode the responses to each frequency-of-occurrence question from three frequency categories ("rarely," "sometimes," "often") into two frequency categories ("rarely or sometimes" and "often")[2]. To avoid losing the original data collected, create a new variable for each frequency-of-occurrence question. Do not overwrite the original data. Here, we refer to the new variables created for each frequency-of-occurrence question as NewQ1, NewQ2, and NewQ3. For each of the new variables created a frequency response of "rarely" (originally coded as "1") is

[2] Although the "rarely" and "sometimes" frequency categories are combined for data analysis, it is important to keep the categories separate for data collection, as field experience has shown that it is easier for respondents to indicate frequency if the three different frequency-of-occurrence response options (i.e., "rarely," "sometimes," and "often") are included in the questionnaire.

coded as “1”; a frequency response of “sometimes” (originally coded as “2”) is coded as “1”; and a frequency response of “often” (originally coded as “3”) is coded as “2”

Step 2. Next, add a code of “0” for households that replied “No” to each corresponding occurrence question. Once this step is completed, all households should have a value of 0, 1, or 2 for each of the three new variables created, NewQ1, NewQ2, and NewQ3.

Step 3. The values of NewQ1, NewQ2, and NewQ3 are then summed for each household to calculate the HHS score. If the tabulation has been carried out correctly, each household will have an HHS score between 0 and 6. These values are then used to generate the HHS indicator.

Tabulation of the Categorical HHS Indicator

To tabulate the categorical HHS indicator, two different cutoff values (> 1 and > 3) are applied to the HHS scores that were generated in Step 3 above. The three household hunger categories are displayed in Table 2 below:

Table 2: Categories of Household Hunger

Household Hunger score	Household Hunger Categories
0-1	Little to no hunger in the household
2-3	Moderate hunger in the household
4-6	Severe hunger in the household

Source: (Ballard et al., 2011)

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

This chapter starts the presentation of the results by looking at descriptive statistics for various individual-level and household-level variables, including general statistics of variables used in the regression models namely, gender parity and women empowerment. Furthermore, the results of WEAI are presented.

4.2 Descriptive Statistics

This section discusses the household characteristics of the respondents. The characteristics discussed are household types, religion, ethnicity, and access to electricity. The results are presented in Tables 3 and 4 for Bangladesh and Uganda respectively.

In Bangladesh, most of the respondents (77.78%) belong to a dual household type (a combination of adult male and female). This implies that household decisions and responsibilities will be shared by man and woman, and thus can lead to greater family dynamics in terms of income and childcare. Most of the respondents were Muslim (82.22%%), which suggests dominating capacity of this religion across the five districts: Khulna, Madaripur, Barguna, Patuakhali, and Jessore. Most of the respondents had access to electricity in their household (69.33%) and this implies that electricity is not a constraint across the five districts in Bangladesh. Empowerment factors/opportunities may be in action in this region. Bengali is the ethnicity of the region (100%). The descriptive statistics for all variables that were used in the WEAI analysis can be found in the statistical appendix (1, 2, 3, and 4).

Table 3: Household characteristics of Bangladesh

Characteristics	Frequency	Percentage
Household type		
Dual household	350	77.78
Female only	100	22.22
Religion		
Muslim	370	82.22
Hindu	80	17.78
Ethnic group		
Bengali	450	100
Access to electricity		
Yes	312	69.33
No	138	30.67
Total	**450**	**100**

Source: Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015)

In Uganda, most of the respondents (76.23%) belong to a dual household type (a combination of adult male and female). This implies that household decisions and responsibilities will be shared by man and woman, and thus can lead to greater family dynamics in terms of income and childcare. This is similar to the household type in Bangladesh. Contrary to the former country, most of the respondents were Christians (74.04%) in which Catholicism is the highest, which suggests dominating capacity of this religion across the four rural districts of Kole, Amuru, Masaka, and Iganga. Most of the respondents had no access to electricity in their household (69.33%) and this implies that electricity is a constraint and might contribute to disempowerment in this region. Mugala is the highest ethnicity in the region (36.07%). The descriptive statistics for all variables that were used in the WEAI analysis can be found in the statistical appendix (6, 7, 8 and 9).

Table 4: Household characteristics of Uganda

Characteristics	Frequency	Percentage
Household type		
Dual household	279	76.23
Female only	86	23.50
Missing information	1	0.27
Religion		
Muslim	71	19.40
Hindu	1	0.27
Christian-Protestant	84	22.95
Christian-Catholic	177	48.36
Christian-Pentecostal	21	5.74
Seventh-day Adventist	10	2.73
Others	1	0.27
Missing information	1	0.27
Ethnic group		
Acholi	68	18.58
Langi	66	18.03
Muganda	132	36.07
Musoga	79	21.58
Others	20	5.46
Missing information	1	0.27
Access to electricity		
Yes	36	9.84
No	330	90.16
Total	**366**	**100**

Source: Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

4.3 The WEAI II Findings

4.3.1 Bangladesh Results

For the sample of women co-residing with at least another adult man, the WEAI is 0.527. The results are presented in Table 5. The WEAI is a weighted average of the 5DE Index value of 0.4846 and the GPI value of 0.9119, where the former contributes 90 percent and the latter 10 percent. In total, 55.5 percent of all women are disempowered with an average inadequacy score of 56.30 percent which implies that they do not have adequate achievements in at least four of the five domains or in a combination of the weighted indicators that make up the least 80 percent of the total. On the other hand, it implies that less than half of the sampled women are empowered (44.5 percent), meaning that they have adequate achievements in at least four of the five domains. Also, 91.19 percent of women have gender parity with the primary male in their household. Of the 8.81 percent of women who do not have gender parity, the empowerment gap between them and the male in their household is quite significant at 21.10 percent. The result of this study is similar to the works of Alkire et al. (2013) in the analysis of the first pilot datasets for three different countries. The result of WEAI found for rural women in Bangladesh (0.76), Guatemala (0.70), and Uganda (0.80) is higher than this study's results. This implies that with time, the level of empowerment changes and this might depend on the subjective responses of the empowerment modules that were administered to people. Nevertheless, achieving gender equality remains a crucial priority in Bangladesh. Additionally, the result of the study is also in tandem with the work of Kruse, (2019) who used the evidence from Tunisia and India to examine the role of women empowerment for security and nutrition. The estimates for GPI, WEAI, and 5DE for Tunisia are 0.876, 0.669, and 0.646 respectively.

Appendix 5 describes the decomposition of each dimension and indicator to explain where women lack empowerment. The domains in the Bangladesh sample areas that contribute most to women's disempowerment are control over resources (24.80 percent) and production (23.34 percent). Almost 100 percent of the women in the survey are not yet empowered and do not have access to and decision on credit, and have little decision-making power over the purchase, sale, or transfer of assets. This implies that lack of resources is a major issue for Bangladesh women. Approximately seventy-three percent of women are not yet empowered in terms of input in production decisions and thirty-seven in autonomy in production. Leadership and income are the

domains that contribute least to women's disempowerment (16.57 and 17.14 percent) respectively. This result is both contrary and similar to the findings of Alkire et al. (2013), where leadership (30.6 percent) contributes most to women's empowerment and resources (21.6 percent) contribute to women's empowerment respectively in Bangladesh. Also, the result of this study is in line with the International Labour Organization (ILO), (2018), where leadership and time use domains are not such important drivers of women's disempowerment.

Figures 2 and 3 show the contribution of each indicator to men's and women's disempowerment. For men, there is little disempowerment in areas such as ownership of assets, purchase or transfer of assets, workload, group membership, and speaking in public. The contribution of domain indicators to men's disempowerment in Figure 2a shows that factors such as ownership of assets, purchase or transfer of assets, and workload contribute less than 5 percent to the overall disempowerment of men. This implies that most household assets are owned and controlled by men in Bangladesh (Sraboni et al., 2013). However, for the women, factors such as access to and decision on credit (21 percent), control over the use of income (17 percent), and input in productive decisions (15 percent) contribute mostly to disempowerment.

Table 5: Bangladesh Pilot II WEAI results

Indices	**Women**	**Men**
Disempowered headcount (H)	55.50%	42.50%
Average Inadequacy Score (A)	56.30%	43.80%
Disempowerment Index (M_0)	0.5154	0.485
5DE Index(1-M_0)	0.4846	0.515
Number of Observations	225	175
Percentage of data used	100.00%	100.00%
Percentage of women with no gender parity (H_{GPI})	41.71%	
Average Empowerment Gap (I_{GPI}))	21.10%	
Gender parity (1- (I_{GPI} * H_{GPI}))	0.9119	
Number of Women in Dual Households	175	
Percentage of data used	77.77%	
WEAI (0.9*5DE + 0.1*GPI)	0.527	

Source: Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015)

Figure 2: Contribution of each Indicator to Disempowerment, Bangladesh Men

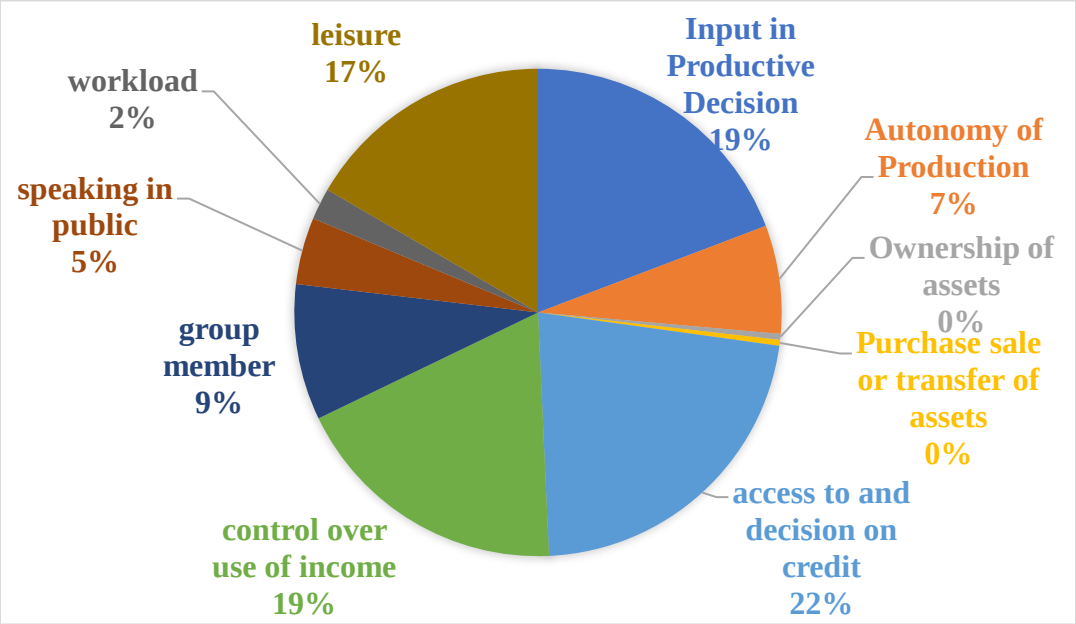
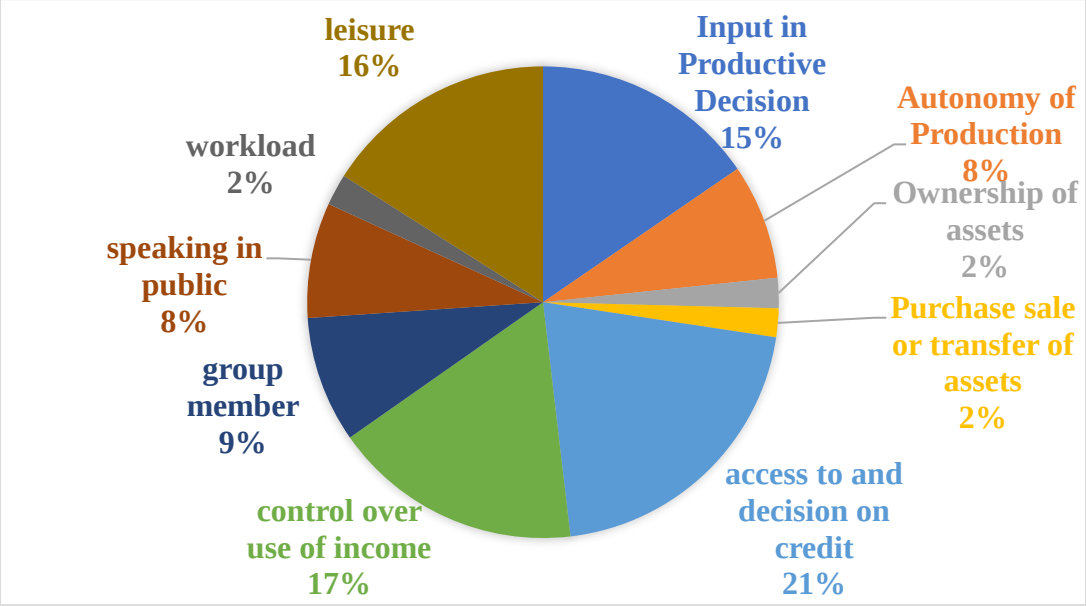


Figure 3: Contribution of each Indicator to Disempowerment, Bangladesh Women



Source: Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015)

4.3.2 Uganda Results

For the sample of women co-residing with at least another adult man, the WEAI is 0.59. The results are presented in Table 6. The WEAI is a weighted average of the 5DE Index value of 0.555 and the GPI value of 0.8930, where the former contributes 90 percent and the latter 10 percent. In total, 58.3 percent of all women are disempowered with an average inadequacy score of 51.30 percent which implies that they do not have adequate achievements in at least four of the five domains or in a combination of the weighted indicators that make up the least 80 percent of the total. On the other hand, it implies that approximately a quarter of the sampled women are empowered (41.7 percent), meaning that they have adequate achievements in at least four of the five domains. Also, 89.30 percent of women have gender parity with the primary male in their household. Of the 10.7 percent of women who do not have gender parity, the empowerment gap between them and the male in their household is quite significant at 21.60 percent.

The result of this study is similar to the works of Alkire et al. (2013) in the analysis of the first pilot datasets for three different countries. Uganda's first pilot results gave the highest WEAI of the three countries, at 0.800, and the 5DE and GPI are 0.789 and 0.898 respectively. In this study, 43.3 percent of women were empowered, compared with 63 percent of men. The 56.7 percent of women who were disempowered lacked empowerment in 37 percent of the domains. Also, this study is contrary to the impact research series, Issue II of the International Labour Organization (ILO), (2018), where they assessed the methodology of the WEAI on women's and youth e empowerment in rural Tunisia. The WEAI and 5DE computed were 0.434 and 0.40 which is low compared to this study. Their results also show that 95 percent of all women are disempowered while 5 percent of women are empowered.

Appendix 10 shows that the Ugandan women who were surveyed are most disempowered in the time and resource domain which contributes to 30.33 and 24.99 percent of their disempowerment respectively. The production domain contributes 21.72% to their disempowerment. In the time domain, there is about 86 percent of surveyed women who are not empowered do not have leisure time and approximately 43 percent do not have a manageable work burden. About 81 percent of the women in the survey are not yet empowered and do not have access to and decision on credit,

and have little decision-making power over the purchase, sale, or transfer of assets. Approximately fifty-two percent of women are not yet empowered in terms of input in production decisions and forty percent in autonomy in production. Leadership and income are the domains that contribute least to women's disempowerment (10.11 and 12.86 percent) respectively. This result is similar to the findings of Alkire et al. (2013), where the time domain (30.6 percent) contributes most to women's empowerment and resources (23.19 percent) contribute to women's empowerment respectively in the first pilot dataset of Uganda

Figures 4 and 5 show the contribution of each indicator to men's and women's disempowerment. For men, there is little disempowerment in areas such as ownership of assets, purchase or transfer of assets, group membership, and speaking in public. The contribution of domain indicators to men's disempowerment in Figure 3a shows that factors such as ownership of assets, purchase or transfer of assets, and speaking in public contribute less than 5 percent to the overall disempowerment of men. However, for the women, factors such as access to and decision on credit (19 percent), control over the use of income (13 percent), and leisure (20 percent) contribute mostly to disempowerment.

Table 6:Uganda Pilot II WEAI results

Indices	**Women**	**Men**
Disempowered headcount (H)	58.30%	41.10%%
Average Inadequacy Score (A)	51.30%	35.80%
Disempowerment Index (M_0)	0.453	0.384
5DE Index(1-M_0)	0.555	0.616
Number of Observations	195	175
Percentage of data used	98.80%	98.80%
Percentage of women with no gender parity (H_{GPI})	49.48%	
Average Empowerment Gap (I_{GPI}))	21.60%	
Gender parity (1- (I_{GPI} * H_{GPI}))	0.8930	
Number of Women in Dual Households	194	
Percentage of data used	98.96%	
WEAI (0.9*5DE + 0.1*GPI)	0.59	

Source: Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

Figure 4: Contribution of each Indicator to Disempowerment, Uganda Men

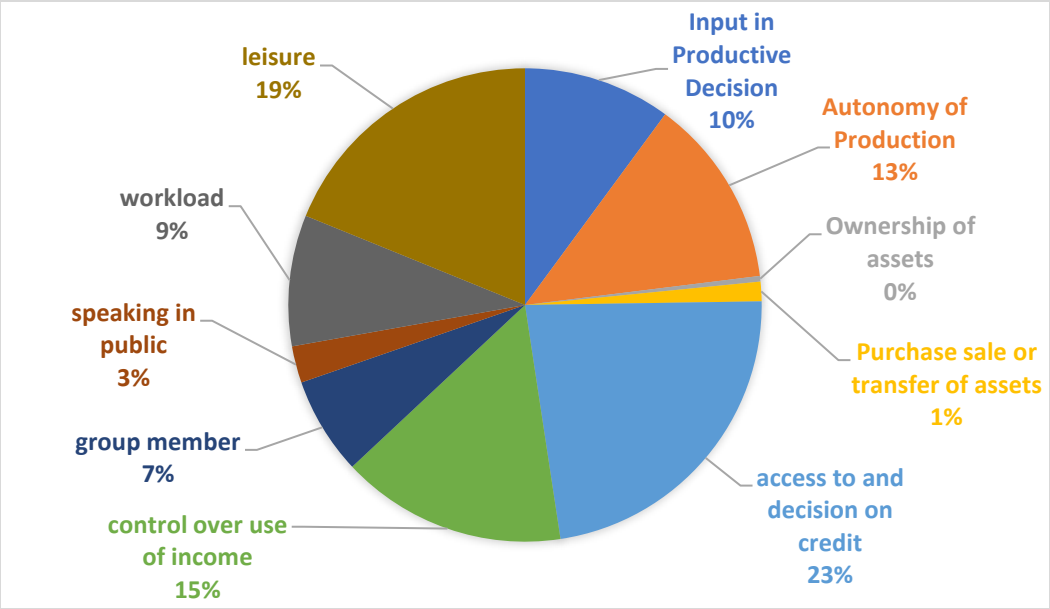
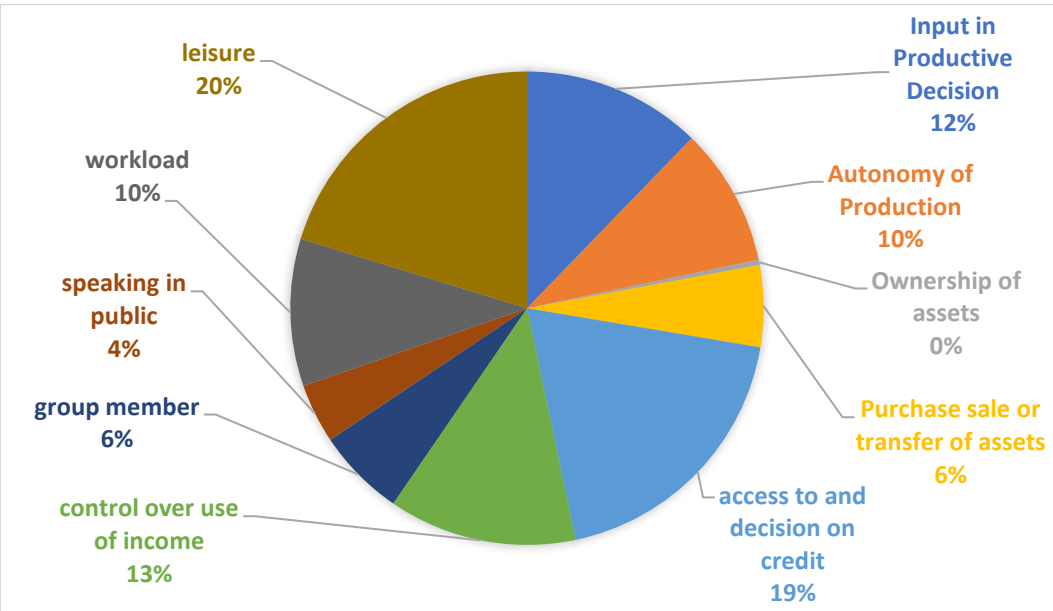


Figure 5:Contribution of each Indicator to Disempowerment, Uganda Women



Source: Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

4.4 Level of Household Hunger Results

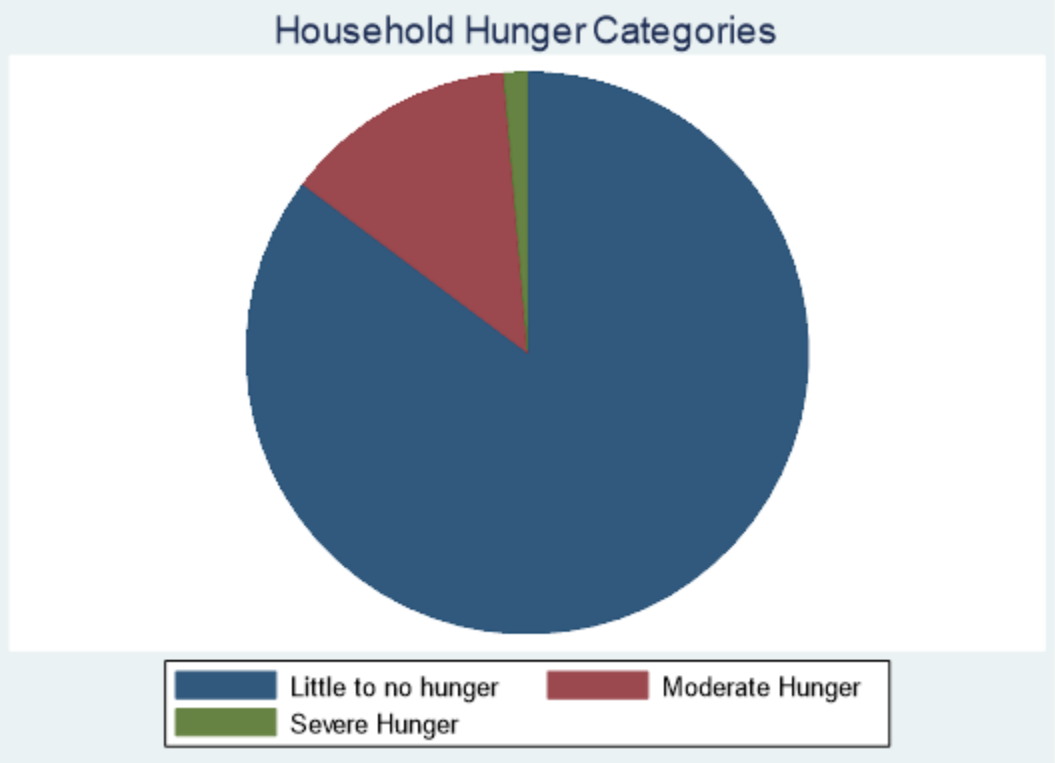
Most of the Ugandan households (85.25%) had little or no hunger. This implies that the households are not deprived of food. In Bangladesh, most of the households (93.11%) had little or no hunger. Both countries have similar results. This is in tandem with the work of Alkire et al., (2013) who employed the WEAI pilot I dataset for Uganda, Bangladesh, and Guatemala to assess the women's empowerment status. The result of the level of household hunger in both countries are presented below:

Table 7: Household Hunger of Uganda (n =366)

Categories	**Frequency**	**Percentage**
Little or no hunger (0-1)	312	85.25
Moderate hunger (2-3)	49	13.39
Severe hunger (4-6)	1	1.37

Source: Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

Figure 6: Level of household hunger in Uganda



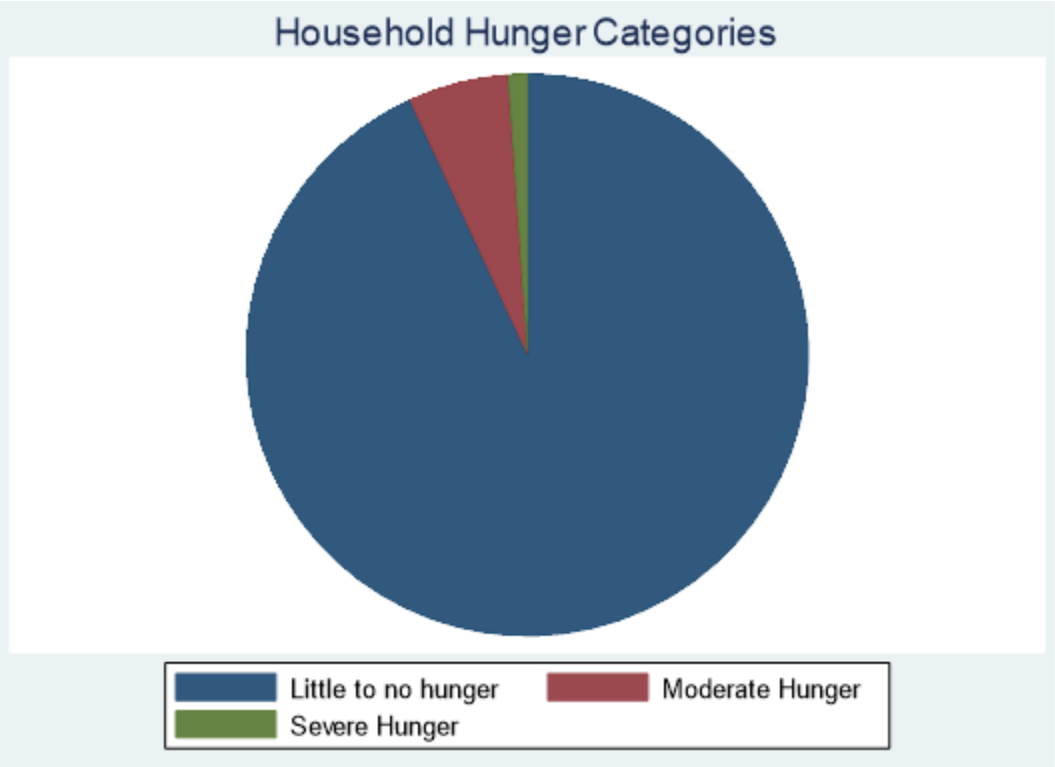
Source: Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

Table 8: Household Hunger of Bangladesh (n =450)

Level of hunger	Frequency	Percentage
Little or no hunger	419	93.11
Moderate hunger	26	5.78
Severe hunger	5	1.11

Source: Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015) **Level of**

Figure 7: Level of household Hunger in Bangladesh



Source: Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015)

4.5 Women's Empowerment and Household Hunger

In Bangladesh, the percentage of women and men not yet empowered in agriculture is higher in households reporting moderate hunger scores. The association is statistically significant for both men and women at a 5% probability level (as shown in Table 9 below). The strength of this association suggests that addressing disempowerment in agriculture for both men and women is a

potential avenue for addressing the issue of hunger and food security. This finding is not consistent with Alkire et al., (2013) where Bangladesh's first pilot results revealed that the relationship between empowerment in agriculture and living in a household reporting a higher hunger score was not statistically significant for women or men.

Table 9 Relationship between Empowerment and Household Hunger in Bangladesh (n=450)

	Women	**empowered**		**Male**	**Empowered**	
	Yes	No	Missing	Yes	No	Missing
Household Hunger Score						
Little to no hunger	0.72%	36.75%	62.53%	0.95%	36.65%	62.29%
Moderate hunger	3.85%	57.69%	38.46%	3.85%	57.69&	38.46%
Severe hunger	0	0	100%	0	0	100%
Pearson chi2 (4)	**11.017**			**10.154**		
P-value	**0.026**			**0.038**		

Source: Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015)

In Uganda, the percentage of women and men (48.98% and 57.69%) not yet empowered in agriculture is higher in households reporting moderate hunger scores. The association is statistically significant for both men and women at 10% and 5% probability levels respectively (as shown in Table 10 below). The strength of this association suggests that addressing disempowerment in agriculture for both men and women is a potential avenue for addressing the issue of hunger and food security. This finding is consistent with Alkire et al., (2013) where Uganda's first pilot results revealed that the relationship between empowerment in agriculture and living in a household reporting severe hunger scores were statistically significant for both women and men at 5% and 10% respectively.

Table 10: Relationship between Empowerment and Household Hunger in Uganda(n=366)

	Women Empowered			**Men Empowered**		
	Yes	No	Missing	Yes	No	Missing
Household Hunger Score						
Little to no hunger	4.17%	32.69%	63.14%	0.95%	36.65%	62.29%
Moderate hunger	8.16%	48.98%	42.86%	3.85%	57.69%	38.46%
Severe hunger	0	20%	80%	0	0	100%
Pearson chi2 (4)	**8.403**			**10.8419**		
P-value	**0.077**			**0.028**		

Source: Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion and Policy Implications

Women's empowerment is a multidimensional and complex issue across the globe. Although, it is a crucial contributor to agricultural productivity, improving health and nutrition, human development outcomes as well as the aspect of human rights (Sell & Minot, 2018). The methodology underlying the WEAI has been designed to track and assess the impact of agricultural interventions that aim to enhance women's empowerment. Using the second pilot datasets for both Bangladesh and Uganda, this study attempts to measure women's empowerment, and household hunger and establish the relationship between them. Further, the study also identifies the individual and household characteristics that influence women's empowerment. Firstly, the results revealed that 55.5% and 58.3% of all women that live in dual households with another male primary decision-maker are disempowered, i.e., they do not have adequate achievements in at least four of the five domains of empowerment in Bangladesh and Uganda respectively. This is due to the lack of resources (assets and credit), input in production decisions, and limited control of income that prevails among rural women. In Bangladesh and Uganda, household women and men who are not empowered in agriculture are associated with moderate hunger scores. This suggests that tackling disempowerment in agriculture is a potential avenue for addressing the issue of hunger and food security. There are several implications of this study for future research on empowerment and gender. They include the following:

1. Based on this second pilot results there is evidence that women and men in rural regions of Bangladesh and Uganda still experiencing disempowerment as well as low economic and human development which are driven by resource constraints. Therefore, there is a need to show a strong disposition to promote gender equality and women's empowerment. The public institutions, policymakers, community, as well as private institutions all, have a role to play in ensuring gender mainstreaming and interventions are put into action to address this issue.
2. This study focuses only on the individual and household characteristics affecting women's empowerment. Future research studies should include factors such as health, geographical, and marriage characteristics affecting women empowerment.

3. This study contributes to the available literature by using the second pilot dataset of WEAI for Bangladesh and Uganda. Although it is a modified version of the first WEAI pilot dataset, to the best of my knowledge and literature search, I have not come across the analysis results of the second pilot dataset.

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APPENDICES

Appendix 1: Case Summaries of each Indicator to Inadequacy Score in Bangladesh by Gender

Gender		Input in Productive Decision	Autonomy of Production	Ownership of assets	Purchase sale or transfer of assets	access to and decision on credit	control over use of income	group member	speaking in public	leisure	workload
Men	Mean	0.84	0.3143	0.0171	0.0171	0.9657	0.8114	0.3943	0.1943	0.7257	0.0914
	% of Total N	43.80%	43.80%	43.80%	43.80%	43.80%	43.80%	43.80%	43.80%	43.80%	43.80%
Women	Mean	0.7289	0.3733	0.0978	0.0933	1	0.8089	0.4089	0.3733	0.7556	0.1022
	% of Total N	56.30%	56.30%	56.30%	56.30%	56.30%	56.30%	56.30%	56.30%	56.30%	56.30%
Total	Mean	0.7775	0.3475	0.0625	0.06	0.985	0.81	0.4025	0.295	0.7425	0.0975
	% of Total N	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Appendix 2: Case Summaries of Disempowerment Index and 5DE in Bangladesh by Gender

Gender		Disempowerment Index M0	Five Domain of Empowerment Index			
Men	Mean	0.485	0.515			
	% of Total N	43.80%	43.80%			
Women	Mean	0.5154	0.4846			
	% of Total N	56.30%	56.30%			
Total	Mean	0.5021	0.4979			
	% of Total N	100.00%	100.00%			

Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015)

Appendix 3: Case Summaries of Disempowered Headcount in Bangladesh by Gender

Disempowered Head Count	Gender	Mean	% of Total N
Disempowered	Men	0.5057	42.50%
	Women	0.4762	55.00%
	Total	0.4891	97.50%
Empowered	Men	0.8333	1.30%
	Women	0.8533	1.30%
	Total	0.8433	2.50%
Total	Men	0.515	43.80%
	Women	0.4846	56.30%
	Total	0.4979	100.00%

Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015)

Appendix 4: Crosstabulation of Disempowered Headcount in Bangladesh by Gender

Gender * Disempowered Head Count Crosstabulation					
			Disempowered Head Count		**Total**
			Disempowered	**Empowered**	
Gender	Men	Count	170	5	175
		% Within Gender	97.10%	2.90%	100.00%
	Women	Count	220	5	225
		% Within Gender	97.80%	2.20%	100.00%
Total		Count	390	10	400
		% Within Gender	97.50%	2.50%	100.00%

Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015)

Appendix 5: Decomposition of 5DE by Domains and Indicators, Bangladesh.

Statistics										
	Production		**Resources**			**Income**	**Leadership**		**Time**	
	Input in productive decisions	Autonomy in production	Ownership of assets	Purchase, sale, or transfer of assets	Access to and decisions on credit	Control over the use of income	Group member	Speaking in public	Work burden	Leisure time
Men										
Censored headcount	0.84	0.3143	0.0171	0.0171	0.9657	0.8114	0.3943	0.1943	0.00914	0.7257
% Contribution	19.22	7.19	0.39	0.39	22.09	18.56	9.02	4.44	2.09	16.60
Absolute contribution	0.0318	0.0119	0.0007	0.0007	0.0422	0.0437	0.0293	0.0144	0.0049	0.0388
% Contribution by dimension		**26.41**		**22.87**		**18.56**		**13.47**		**18.69**
Women										
Censored headcount	0.7289	0.3733	0.0978	0.0933	0.98	0.8089	0.4089	0.3733	0.1022	0.7556
% Contribution	15.44	7.91	2.07	1.98	20.75	17.13	8.66	7.91	2.16	16.0
Absolute contribution	0.0312	0.0160	0.0039	0.0038	0.0395	0.0472	0.0247	0.0225	0.0056	0.0416
% Contribution by dimension		**23.34**		**24.80**		**17.13**		**16.57**		**18.17**

Source: Authors' calculation using the WEAI Pilot II Dataset for Bangladesh (2015)

Appendix 6: Case Summaries of each Indicator to Inadequacy Score in Uganda by Gender

Gender		Input in Productive Decision	Autonomy of Production	Ownership of assets	Purchase sale or transfer of assets	access to and decision on credit	control over use of income	group member	speaking in public	leisure	workload
Men	Mean	0.3655	0.469	0.0138	0.0483	0.8276	0.5586	0.2414	0.0909	0.6828	0.3241
	% of Total N	42.80%	42.80%	42.80%	42.80%	42.80%	42.80%	42.80%	42.70%	42.80%	42.80%
Women	Mean	0.5206	0.4021	0.0155	0.2371	0.8093	0.5464	0.2577	0.1719	0.8608	0.4278
	% of Total N	57.20%	57.20%	57.20%	57.20%	57.20%	57.20%	57.20%	57.30%	57.20%	57.20%
Total	Mean	0.4543	0.4307	0.0147	0.1563	0.8171	0.5516	0.2507	0.1373	0.7847	0.3835
	% of Total N	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

Appendix 7: Case Summaries of Disempowerment Index and 5DE in Uganda by Gender

	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Disempowerment Index	335	98.80%	4	1.20%	339	100.00%
Five Domains of Empowerment	335	98.80%	4	1.20%	339	100.00%

Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

Appendix 8: Case Summaries of Disempowered Headcount in Uganda by Gender

Disempowered Head Count	**Gender**	**Mean**	**% of Total N**
Disempowered	Men	0.5736	35.80%
	Women	0.5242	51.30%
	Total	0.5445	87.20%
Empowered	Men	0.8362	6.90%
	Women	0.8167	6.00%
	Total	0.8271	12.80%
Total	Men	0.6159	42.70%
	Women	0.5547	57.30%
	Total	0.5808	100.00%

Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

Appendix 9: Crosstabulation of Disempowered Headcount in Uganda by Gender

			Empowered Head Count		Total
			Disempowered	Empowered	
Gender	Men	Count	120	23	143
		% Within Empowered Head Count	41.10%	53.50%	42.70%
	Women	Count	172	20	192
		% Within Empowered Head Count	58.90%	46.50%	57.30%
Total		Count	292	43	335
		% Within Empowered Head Count	100.00%	100.00%	100.00%

Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)

Appendix 10: Decomposition of 5DE by Domains and Indicators, Uganda.

Statistics										
	Production		**Resources**			**Income**	**Leadership**		**Time**	
	Input in productive decisions	Autonomy in production	Ownership of assets	Purchase, sale, or transfer of assets	Access to and decisions on credit	Control over the use of income	Group member	Speaking in public	Work burden	Leisure time
Men										
Censored headcount	0.3655	0.469	0.0138	0.0483	0.8276	0.5586	0.2414	0.0909	0.3241	0.6828
% Contribution	10.09	12.95	0.38	1.33	22.85	15.42	6.66	2.51	8.95	18.85
Absolute contribution	0.016	0.020	0.01	0.02	0.034	0.036	0.026	0.010	0.012	0.025
% Contribution by dimension		**23.04**		**24.56**		**15.42**		**9.17**		**27.80**
Women										
Censored headcount	0.5206	0.4021	0.0155	0.2371	0.8093	0.5464	0.2577	0.1719	0.4278	0.8608
% Contribution	12.25	9.46	0.36	5.58	19.05	12.86	6.06	4.05	10.07	20.26
Absolute contribution	0.024	0.019	0.001	0.009	0.032	0.042	0.025	0.017	0.014	0.28
% Contribution by dimension		**21.72**		**24.99**		**12.86**		**10.11**		**30.33**

Source: Authors' calculation using the WEAI Pilot II Dataset for Uganda (2015)