Socioeconomic Determinants of Women's Empowerment in Agricultural Value Chains in Malawi: A Decomposition Analysis

Gerald Ngagwe[1] and Gowokani Chijere Chirwa[2]

Abstract

This paper investigates the socioeconomic factors influencing women's empowerment in the agricultural value chains in Malawi. The primary objective is to quantify the individual effects of these factors on women's empowerment. Data was derived from a survey assessing the impact of the Agriculture Technical and Vocational Education and Training for Women (ATVET4Women) program in Malawi, which included 544 households (938 men and women) involved in vegetable value chains. The study utilized the OLS method to analyze the influence of women's socioeconomic factors on their empowerment. A detailed decomposition analysis was conducted using recentered influence functions (RIF) to determine the specific contribution of each factor to women's empowerment in agricultural value chains. The study revealed that having more children reduces women's empowerment. Furthermore, marital status, number of children, and age do account for differences in empowerment. Interestingly, women with education were found to be less empowered compared to those without education. However, factors such as location and a history of child or teen pregnancy do not affect women's empowerment levels or explain the empowerment differences between men and women.

Keywords: *Women empowerment; RIF decomposition; Socio-demographic factors; Malawi*

Corresponding authors

[1] **Gerald Ngagwe**
Master of Arts in Economics Student
University of Malawi
Zomba, Malawi
Email: ma-eco-n-09-22@unima.ac.mw

[2] **Gowokani Chijere Chirwa, PhD**
Associate Professor of Economics
University of Malawi
Zomba, Malawi
Email: gchirwa@unima.ac.mw

1 Background

Agriculture is a vital sector in Malawi that employs 80% of the population and contributes 30% to GDP (Giertz et al., 2015). According to Patil and Babus (2018), women makeup 52 percent of the agriculture workforce and substantially impact agriculture production and food security. Despite this, women's full participation in agriculture value chains faces challenges and gender differences that limit their empowerment. Kabeer (2001) defines empowerment as the expansion of people's ability to make strategic life choices, particularly in contexts where this ability has been denied to them. Women's participation is limited by several factors which include limited access to farm inputs, credit, markets, agricultural information, and societal or cultural norms and beliefs (Njuki et al., 2021). It has however been shown that if the government invests in empowering both women and men in the household the gains from agriculture will improve and women can benefit equally (Huyer, 2016). In addition, closing the gender gap in the country could result in the lifting of 238,000 Malawians out of poverty and an increase of roughly $100 million to Malawi's GDP (UN Women, 2015).

Over the years, government and various international organizations' interventions have targeted women. The rationale for this has been that when benefits accrue to women, the whole household is more likely to benefit than when they accrue to men. Women, it has been argued, can also increase their contribution to household income and resources when they are engaged more comprehensively and more directly in agricultural value chains (Quisumbing et al., 2021). Moreover, recognition that there are gender differences between men and women has also increased among development partners and the government. It is thus viewed as more rational to consider these differences when designing agricultural interventions.

Few empirical studies have laboured to study the socio-demographic determinants of empowerment. However, several empirical studies have investigated on empowering effect of specific economic characteristics or interventions, rather than including socio-demographic determinants of empowerment. Allendorf (2012) used an OLS regression in measuring women's empowerment by their mobility and decision-making in terms of spending. Area of residence, higher education, employment outside the household, and family relationship quality were identified as correlates of married mothers'

empowerment in India. Anderson and Eswaran (2009) used the 2SLS approach to study whether it is earned income or unearned income that is more effective in enhancing the autonomy of one within the household. It was found that a woman's assets, woman's earnings from work, and the time a woman worked for income have a positive impact on empowerment. However, the effect of age was found to be negative.

This study, in embracing the principle of parsimony, addresses this gap by employing a Recentered Influence Function (RIF) decomposition. The aim is to systematically analyze and quantify the individual contributions of various socioeconomic factors to women's empowerment, specifically but not limited to marital status, education and early pregnancy, within the context of the agricultural value chains with a specific focus on vegetable value chains. RIF decomposition as the chosen method also provides insights into how the individual factors interact and collectively influence women's empowerment. This research is not only positioned to validate prior conclusions but also to offer a sophisticated understanding of the specific elements influencing women's empowerment in the agricultural sector, informing targeted interventions and policy decisions.

2 Methodology

This section discusses the methodology. There are four sections as follows: data sources, conceptual framework, empirical framework, and variables.

2.1 Women Empowerment in Agriculture Index (pro-WEAI)

The study employed the project-level Women Empowerment in Agriculture Index (pro-WEAI) tool developed by the International Food and Research Institute (IFPRI) to measure the impact of agricultural development interventions on women's empowerment (Quisumbing et al., 2021). WEAI unlike other indices of women empowerment, allows for a direct comparison of men and women in one household (Malapit et al., 2019).

WEAI includes two sub-indices:

(i.) 3-Domains of Empowerment sub-index (3DE), which measures the degree and complexity of women's empowerment. 3DE captures five dimensions of

women empowerment namely, decision-making, access to and control over resources, control over income, leadership, and time-use; and

(ii.) the Gender Parity sub-index, which measures gender parity between men and women in the same household based on their respective empowerment scores (Quisumbing et al., 2021). The Parity Index is a subset of the empowerment index and compares the relative empowerment of women to men in each of the five dimensions. It provides a ratio that indicates the level of gender parity, with a value of 1 indicating complete gender equality.

Therefore, the overall Women's Empowerment Index (WEAI) is a composite of 90% of women's 5DE and 10% of GPI (Mulugeta, 2020), and is mathematically given as;

$$WEAI = (5DE * 0.9) + (GPI * 0.1) \quad (2.1)$$

This is a bounded continuous variable that takes values between 0 and 1, where 1 is for fully empowered and 0 for not empowered.

2.2 Decomposition of the WEAI

In order to determine the extent to which the socio-demographic factors determine empowerment differences between men and women, the study employed the Recentered Influence Functions (RIF) decomposition of the WEAI. RIF involves a two-stage procedure to perform the Oaxaca Blinder type decomposition on any distributional measure, and not only the mean (Firpo et al., 2018).

Recentered Influence Function (RIF) decomposition is a method used to decompose the difference in outcome between two groups into components that are attributed to differences in observable characteristics and differences in the returns to those characteristics. (Firpo et al., 2009).

RIF is estimated firstly by computing the sample quantile, and then secondly by the density at each quantile. Thus, the RIF is obtained by the equation:

$$RIF(y; q_\theta) = q_\theta + \frac{\theta - 1[y \leq q_\theta]}{f(q_\theta)} \quad (2.2)$$

Where q_θ is the θth quantile of women empowerment, and f(q_θ) is the unconditional density of women empowerment at the θth quantile. Variable y is women empowerment, and 1[y≤q_θ] is an indicator function that shows whether the outcome of interest is equal to or smaller than the θth quantile.

The θth quantile of the WEAI represents a value below which θ percent of the observations fall. For instance, if we are interested in the 50th quantile of the WEAI, this represents the value below which half of the observations fall. In other words, the 50th quantile represents the threshold above which women are more empowered than 50% of the women in the sample. Assuming that the expectation of RIF is linear and the mean of the error term is zero, equation (4.5) can be expressed as;

$$E[RIF(y; q_\theta)|X] = X\beta^\theta \quad (2.3)$$

Equation (2.3) is similar in spirit to OLS, the difference is that in the UQR, the RIF is used as the dependent variable (Firpo et al., 2009). For each quantile, the coefficients can then be estimated as;

$$q_\theta = E_X\big[E[RIF(y; q_\theta)|X]\big] = E[X]\beta^\theta \quad (2.4)$$

Equation (2.4) can then be decomposed in the spirit of Oaxaca-Blinder decomposition. This Female, B = Male) as;

$$\Delta_y^\theta = q_{A|A}^\theta - q_{B|B}^\theta = \big[RIF\big(y_A; q_{A,\theta}\big)|X\big] - \big[RIF\big(y_B; q_{B,\theta}\big)|X\big] \quad (2.5)$$

$$\Delta_y^\theta = \underbrace{(\hat{\beta}_{A,\theta} - \hat{\beta}_{B,\theta})\,\bar{X}_B}_{\hat{E}} + \underbrace{(\bar{X}_A - \bar{X}_B)\hat{\beta}_{B,\theta}}_{\hat{C}} + \underbrace{(\bar{X}_A - \bar{X}_B)\,(\hat{\beta}_{A,\theta} - \hat{\beta}_{B,\theta})}_{\hat{I}} \quad (2.6)$$

In equation (2.4), (E) amounts to the part of the differential that is due to group differences in the predictors also known as the "endowments effect" in labour economics. The second component, (C) represents the contribution of differences in the coefficients (including differences in the Intercept). The last component (I), is the interaction term, accounting for the fact that differences in endowments and coefficients exist simultaneously between the two groups, but are difficult to interpret (Jann, 2008; O'Donnell and Wagstaff, 2008).

2.3 Data

The study used survey data from a survey commissioned by the International Policy Food and Research Institute (IFPRI) on the impact of the Agriculture Technical and Vocational Education and Training for Women (ATVET4Women) program. The survey targeted 544 households (938 men and women) involved in vegetable value chains in five districts of Malawi where the program was piloted namely Blantyre, Chiradzulu, Nkhotakota, Chitipa and Lilongwe.

2.3.1 Dependent variable

The dependent variable is empowerment proxied by the WEAI score. This is a bounded continuous variable that takes values between 0 and 1, where 1 is for fully empowered and 0 for not empowered.

2.3.2 Independent Variables

In line with Kabeer's (1999) theoretical approach and other existing empirical studies: Allendorf (2012), Anderson and Eswaran (2009), discussed in Chapter 3, age, gender, education, area of residence, and marital status affect empowerment as they are indicators of the resources needed to affect change in one's own life and community. As such independent variables for the study are the following; age, marital status, education, location, child or teen pregnancy before 18, number of children, and an interaction term for education and child or teen pregnancy before the age of 18.

Marital status captured whether an individual is married or not and included the following categories: monogamous married, polygamous married, separated, divorced, widow, and unmarried. Education captured an individual's educational attainment and included the following categories: no school, primary graduate, secondary school graduate, and technical or vocational graduate. Location captured a respondent's residential place. That is whether an individual is coming from an urban or a rural area.

Child or Teen Pregnancy Before 18 captured whether an individual has had a history of child or teen pregnancy. Number of children captured the number of children women have. Education*Child or Teen Pregnancy captured the interaction effect of education and teen pregnancy, illustrating a complex relationship with empowerment. Generally, women with a history of teen pregnancy are expected to have lower empowerment. However, when these women are provided with education and other socio-economic opportunities, their empowerment outcomes tend to improve.

3 RESULTS

3.1 Descriptive statistics

The study presents the descriptive statistics in Table 3.1 and in Figure 5.1-5.4 present marital, education, age, and household-type analysis of the study.

Table 3.1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Empowerment score	1124	.203	.138	0	.667
Age	1132	26.502	17.583	0	93
Marital Status	859	.595	.491	0	1
Education level	1132	.483	.5	0	1
Urban	1132	.011	.107	0	1
Child Teen pregnancy	940	.005	.073	0	1
Number of Children	1132	3.238	1.639	0	12
Education Teen pregnancy	940	.001	.033	0	1

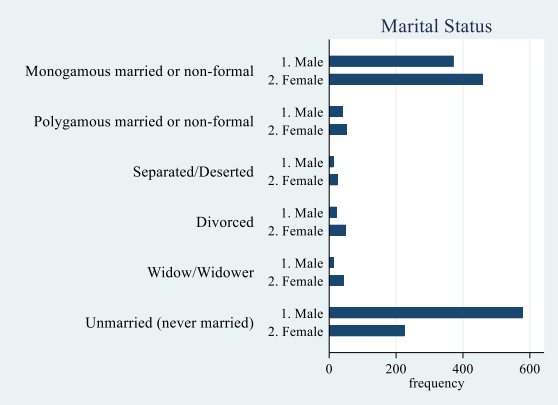


Figure 3.1: Marital Status

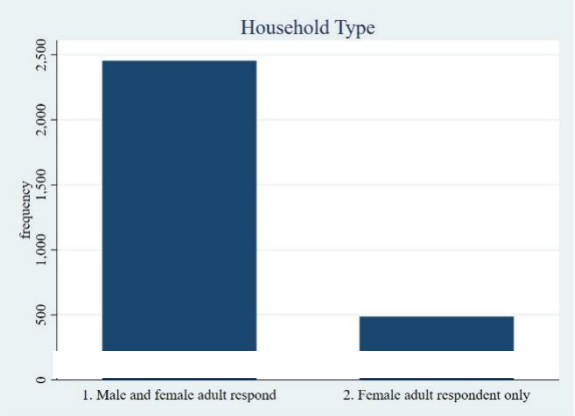


Figure 3.2: Household type

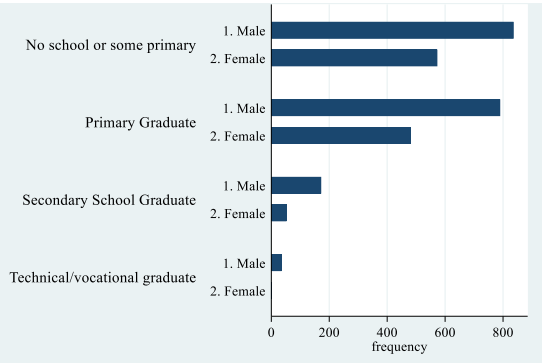


Figure 3.4: Education status

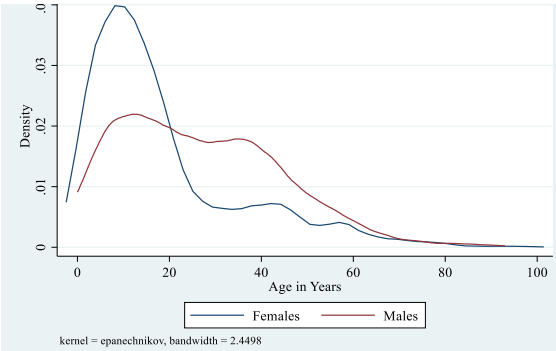


Figure 3.5: Age

The analysis as presented in figures 5.1-5.4 shows that a significant proportion of the male respondents are under the age of 20.

Women's respondents are concentrated within the 50-10 age group. Dual-headed households are more common than female-headed households representing at least 80% of the total respondents. Female-adult respondents constitute less than 20% of the total respondents. The majority of the respondents are either in monogamous and non-formal marriages or have never been married. More males are unmarried than females and more females are in monogamous marriages as compared to males. Few are in polygamous or in non-formal marriages, separated or divorced or deceased, divorced or widowed. Furthermore, at least 90% of the respondents had either never attended school or dropped out during primary school. Less than 10% reached secondary education and tertiary education.

The dependent variable in the regression is the empowerment score. As presented in Table 5.2, the mean empowerment score is 0.2.

3.2 Pro-WEAI Results

Table 3.1: pro-WEAI results

	Women	**Men**
Number of observations	539	363
5/3DE Index	0.225	0.195
% Not achieving empowerment (H)	100	100
Mean disempowerment score (A)*	0.775	0.805
Number of dual households	361	.
Gender Parity Index (GPI)	0.837	.
% Without gender parity (HGPI)	26.9	.
Mean empowerment gap (IGPI)	0.606	.
WEAI/A-WEAI/pro-WEAI	0.286	.

Note: * Refers to the mean disempowerment score among only women/men who are disempowered wh5/3DE = 1> - (H*A); GPI = 1 - (HGPI*IGPI)

No one in the sample achieves empowerment. Thus, both men and women are not empowered in the sample. The mean disempowerment score for women and men in the sample is 0.77 and 0.80 for women and men respectively. That is on average, disempowered women and men in the sample score 0.77 and 0.80 respectively on the

components which are measured on a scale of 0 to 1. This translates into a relatively high level of disempowerment among the subgroups of women than men.

The Gender Parity score in the sample is 0.83 implying that 83% of the households in the sample achieve gender parity. However, the percent without gender parity score is 0.269 implying that 26.9% of women in the sample do not achieve gender parity.

The mean empowerment gap (IGPI) score for the sample is 0.60 which means that women in the sample are relatively very far from the desired empowerment level.

Pro-WEAI score for the sample is 0.286 which indicates that there is a low level of women empowerment.

3.3 Results of the Ordinary Least Squares Regression

The results of an OLS regression to examine the effect of socio-demographic factors on women's empowerment in Malawi are given in the table below:

Table 3.2: Socio-Economic Determinants of Women Empowerment in Agriculture Value Chains in Malawi

VARIABLES	**Coefficients**
Age	-0.000708***
	(0.000368)
Marital Status	0.0389***
	(0.0116)
Education	-0.0632***
	(0.0106)
Location	-0.0212
	(0.0395)
Child or teenage pregnancy	0.0131
	(0.0684)
Number of Children	-0.00550***
	(0.00309)
Education Teen pregnancy (Interaction_Term)	-0.0403
	(0.152)
Constant	0.252***
	(0.0182)
Observations	1,530
R-squared	0.087

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

From Table 5.5 above, overall, the model explains 8.7 percent of the variation in women's empowerment scores in agricultural value chains in Malawi. This implies that the model explains less of the variation in women's empowerment. For each additional year of age, the empowerment score decreases by 0.0008, holding all other variables constant.

Under marital status, being married as compared to not, is on average associated with an increase in empowerment scores by 0.0389 holding all other variables constant. This is supported by Biswas and Mukhopadhyay (2018) who instituted that married women are more empowered as compared to unmarried women. This is so because married women jointly make household decisions with their husbands. Certain societal norms bar unmarried women from taking part in activities in the society. However, this is in contrast to Nikkhah et al. (2010) finding that divorced women have more levels of empowerment compared to married women.

For education, being educated than not is associated with lower empowerment levels by 0.0632 holding all other variables constant. This is in contrast with the Human Capital theory which states that education increases empowerment (Reshi et al., 2022). In a study by Ragasa et al. (2021), it was found that the main cause of disempowerment among women is the lack of work balance. Thus, educated women might encounter challenges in balancing work and family responsibilities, which ultimately affects their empowerment levels. Moreover, according to the Malawi Demographic and Health Survey (NSO, 2017), there are disparities in literacy levels between men and women with women at 44% and men at 72%. As such women who participate in agriculture may be those with lower levels of education. An additional child in the family will result in lower empowerment scores by 0.0055 holding all other variables constant. Thus, having more children is associated with lower levels of women empowerment which agrees with Upadhyay et al. (2014) finding that having more children limits a woman's time, energy, and opportunities for further personal development. The location a woman comes from, having a history of teen pregnancy, and the interaction term between education and teen pregnancy have no significant effect on women's empowerment.

3.4 RIF decomposition of the Women Empowerment

In order to examine the specific contribution each demographic factor makes to women empowerment in the agriculture value chains, a detailed RIF decomposition of women empowerment was computed. The results are given in the Table 5.6.

From the decomposition results in Table 5.6, there are significant gender differences in empowerment at the median (50^{th} quantile) and upper-middle (75^{th} quantile) levels of the empowerment distribution. This indicates that the differences between men's and women's empowerment are more pronounced at higher levels of empowerment.

Marital status and the number of children contribute to empowerment differences between men and women in all the 3 quantiles. This demonstrates that regardless of the level of empowerment, these factors consistently influence women's empowerment. Age contributes to the differences in empowerment between men and women in the lower (25^{th} quantile) and median (50^{th} quantile) empowerment levels. This demonstrates that age-related factors affecting empowerment diminish as empowerment increases. Location, history of child or teen pregnancy, and the interaction term between education and history of having a teen pregnancy do not contribute to the differences in empowerment between men and women. The explained component is significant in all empowerment levels, suggesting that the included variables account for some of the gender differences in empowerment. However, the unexplained component is significant at the higher empowerment level suggesting that other factors are not captured by the model that explain gender differences in empowerment.

Table 3.3: Detailed Decomposition of Socio-Economic Determinants of Women Empowerment in Agriculture Value Chains in Malawi

		25th Quantile			50th Quantile			75th Quantile	
VARIABLES	Overall	Explained	Unexplained	Overall	Explained	Unexplained	Overall	Explained	Unexplained
Age		0.00295***	0.0137**		0.00384***	0.0148		0.000619	-0.00216
		(0.00111)	(0.00691)		(0.00141)	(0.00960)		(0.00195)	(0.0124)
Marital Status		-0.00850***	-0.0163***		-0.00562***	-0.0102**		-0.00714***	-0.0132**
		(0.00162)	(0.00329)		(0.00171)	(0.00454)		(0.00255)	(0.00574)
Education		-0.00141**	0.00525		-0.00208**	-0.00743		-0.00352**	0.00134
		(0.000635)	(0.00354)		(0.000858)	(0.00482)		(0.00139)	(0.00643)
Location		-0.000392	0.00177**		-7.70e-05	-0.000819		0.000474	-0.00211
		(0.000352)	(0.000770)		(0.000327)	(0.000922)		(0.000574)	(0.00133)
Child or teenage pregnancy		0.000146	0.000424		0.00172	-0.00313*		0.00119	-0.00246
		(0.000973)	(0.00135)		(0.00130)	(0.00187)		(0.00189)	(0.00255)
Number of Children		0.00178**	-0.0342***		-0.000633	-0.0197**		-0.00305*	-0.00257
		(0.000883)	(0.00667)		(0.00103)	(0.00889)		(0.00167)	(0.0122)
Education_Teen_Preg		0.000514	-8.96e-05		-0.00344	0.00363		-0.00266	0.00280
		(0.00164)	(0.00180)		(0.00223)	(0.00245)		(0.00321)	(0.00349)
Males	0.132***			0.228***			0.270***		
	(0.00186)			(0.00299)			(0.00299)		
Females	0.137***			0.242***			0.348***		
	(0.00278)			(0.00339)			(0.00520)		
difference	-0.00514			-0.0143***			-0.0772***		
	(0.00334)			(0.00452)			(0.00600)		
explained	-0.00491**			-0.00629**			-0.0141***		
	(0.00238)			(0.00290)			(0.00442)		
unexplained	-0.000228			-0.00798			-0.0632***		

	(0.00394)	(0.00517)	(0.00716)	
Constant		0.0292***	0.0148	-0.0448**
		(0.0109)	(0.0146)	(0.0201)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4 Discussion

The study reveals that socio-demographic factors play a role in determining empowerment differences between men and women. However, these factors explain only a small portion of the variation in women's empowerment, suggesting that other unaccounted-for factors influence empowerment. Specifically, the study finds that age, marital status, education attainment, and the number of children impact women's empowerment. Interestingly, a woman's history of teen pregnancy, urban or rural background, and the interaction between education and teen pregnancy do not significantly affect empowerment.

Notably, education has a negative effect on women's empowerment within Malawi's agricultural value chains. Women with no education tend to be more empowered than those with some education. Conversely, being married is associated with increased empowerment scores. Additionally, having more children is linked to lower empowerment levels, and as women age, their empowerment tends to decrease.

Decomposition results indicate that location, history of child or teen pregnancy, and the interaction term between education and teen pregnancy do not account for the differences in empowerment between men and women.

4.1 Limitations and directions for further study

The study used survey data collected in a few districts soon after the intervention. There is a need to collect more data after the project has been phased out for a long time to see the real effect. There is also a need to study the reasons why education negatively correlates with empowerment in the agricultural value chains in Malawi. Resource constraint was the hindrance to undertaking this analysis for this study.

5 Conclusion

The significant variables accounting for the differences in the explained component necessitate targeted policy interventions. The empowerment disparities between men and women in agricultural value chains highlight the urgency for the Government of Malawi to implement strategies that enhance women's empowerment. Such strategies

should include inclusive business education and comprehensive technical and vocational training programs.

The result that being married results in more empowerment, implores the idea of the government to introduce interventions that also engage and support the husband apart from the wife in the family setting. By empowering both husbands and wives, the overall productivity and well-being of families can be significantly improved.

The result that those with more education are less empowered as compared to those with no education, implores the government to introduce practical interventions that will be well more suited to the educated. This will motivate and attract educated women to increase participation in agriculture. Leveraging their skills and knowledge through appropriate programs can maximize their impact and contribution to empowerment. The educated with their skills and knowledge will exert more impact than the less educated.

Additionally, the correlation between having more children and reduced empowerment underscores the importance of promoting effective family planning methods among women. Ensuring that families are of a manageable size can contribute to better care and improved empowerment outcomes for women.

REFERENCES

Cho, S., Crenshaw, K. W., & McCall, L. (2013). Toward a field of intersectionality studies: Theory, applications, and praxis. *Signs: Journal of Women in Culture and Society*, *38*(4), 785–810.

Contreras, S. M. (2020). *Two essays on the women's empowerment in agriculture: An empirical assessment of the WEIA and a theoretical proposal with relationship to time allocation*. Kansas State University.

Crookston, B. T., West, J. H., Davis, S. F., Hall, P. C., Seymour, G., & Gray, B. L. (2021). Understanding female and male empowerment in Burkina Faso using the project-level Women's Empowerment in Agriculture Index (pro-WEAI): A longitudinal study. *BMC Women's Health*, *21*(1), 230.

Doepke, M., & Tertilt, M. (2019). Does female empowerment promote economic development? *Journal of Economic Growth*, *24*, 309–343.

Donald, A., Koolwal, G., Annan, J., Falb, K., & Goldstein, M. (2020). Measuring women's agency. *Feminist Economics*, *26*(3), 200–226.

Doss, C. (2013). Intrahousehold bargaining and resource allocation in developing countries. *The World Bank Research Observer*, *28*(1), 52–78.

Dunga, H. M., & Dunga, S. H. (2019). Households characteristics that determine perceptions on girl education in Malawi. *Acta Universitatis Danubius. Œconomica*, *15*(6).

Ferber, M. A., & Nelson, J. A. (2009). *Beyond economic man: Feminist theory and economics*. University of Chicago Press.

Firpo, S., Fortin, N., & Lemieux, T. (2018). *Decomposing wage distributions using recentered influence function regressions. Econometrics, 6 (2), 28*.

Firpo, S., Fortin, N. M., & Lemieux, T. (2009). Unconditional quantile regressions. *Econometrica*, *77*(3), 953–973.

Forsythe, L., Posthumus, H., & Martin, A. (2016). A crop of one's own? Women's experiences of cassava commercialization in Nigeria and Malawi. *Journal of Gender, Agriculture and Food Security*, *1*(2), 110–128.

Galafa, B., & Msiska, T. (2019). How gender norms contribute to gender-based violence in the workplace in Malawi. *Advance Learning Innovation on Gender Norms*.

Giertz, Å., Caballero, J., Dileva, M., Galperin, D., & Johnson, T. (2015). Managing agricultural risk for growth and food security in Malawi. *Agriculture Global Practice Note-October 2015; World Bank Group*.

Hussein, M. K. (2021). Women's participation in local development–A case study of Zomba District Council in Malawi. *Development Southern Africa*, *38*(6), 954–966.

Huyer, S. (2016). Closing the gender gap in agriculture. *Gender, Technology and Development*, *20*(2), 105–116.

Johnson, N. L., Kovarik, C., Meinzen-Dick, R., Njuki, J., & Quisumbing, A. (2016). Gender, assets, and agricultural development: Lessons from eight projects. *World Development*, *83*, 295–311.

Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*, *30*(3), 435–464.

Kabeer, N. (2001). *Reflections on the Measurement of Women's Empowerment*.

Kabeer, N. (2005). Gender equality and women's empowerment: A critical analysis of the third millennium development goal 1. *Gender & Development*, *13*(1), 13–24.

Kumar, N., Raghunathan, K., Arrieta, A., Jilani, A., & Pandey, S. (2021). The power of the collective empowers women: Evidence from self-help groups in India. *World Development*, *146*, 105579.

Lovell, E. (2021). Gender equality, social inclusion and resilience in Malawi. *Building Resilience and Adapting to Climate Change*.

Malapit, H., Quisumbing, A., Meinzen-Dick, R., Seymour, G., Martinez, E. M., Heckert, J., Rubin, D., Vaz, A., Yount, K. M., & Phase, G. A. A. P. (2019). Development of the project-level women's empowerment in agriculture index (pro-WEAI). *World Development*, *122*, 675–692.

Mathiassen, A., Eliasi, R., Mahowe, M., Chunga, D., Iversen, G., Pedersen, S. I., & Roll-Hansen, D. (2007). *Gender assessment for Malawi*.

Motaung, M. V., Bosompem, M., Mensah, A. O., & Kamanda, P. J. (2023). Women (dis) empowerment Status in Agriculture: The Case of Botswana Participants in Livestock Management and Infrastructure Development Programme. *Journal of Sustainable Development in Africa*, *25*(1).

Mulugeta, T. (2020). Paper 4: Agricultural Technologies and Women's Empowerment in Rural Ethiopia: Do Improved Agricultural Technologies Matter? *Impacts of Improved Agricultural Technologies Adoption on Multidimensional Welfare Indicators in Rural Ethiopia*, 133.

Njuki, J., Eissler, S., Malapit, H. J., Meinzen-Dick, R., Bryan, E., & Quisumbing, A. R. (2021). *A review of evidence on gender equality, women's empowerment, and food systems*. International Food Policy Research Institute.

NPC. (2020). *Malawi 2063*.

NSO. (2016). *Malawi demographic and health survey 2015-16*.

NSO. (2018). Malawi population and housing census. *Lilongwe: Malawi National Statistics Office*.

Pathania, S. K. (2017). Sustainable development goal: Gender equality for women's empowerment and human rights. *International Journal of Research*, *5*(4), 1–15.

Patil, B., & Babus, V. S. (2018). Role of women in agriculture. *Int J Applied Res*, *4*(12), 109–114.

Peterman, A. (2011). Women's property rights and gendered policies: Implications for women's long-term welfare in rural Tanzania. *The Journal of Development Studies*, *47*(1), 1–30.

Quisumbing, A., Heckert, J., Faas, S., Ramani, G., Raghunathan, K., Malapit, H., Malapit, H., Heckert, J., Eissler, S., Faas, S., Martinez, E., Myers, E., Pereira, A., Quisumbing, A., Ragasa, C., Raghunathan, K., Rubin, D., Seymour, G., & The pro-WEAI for Market Inclusion Study Team. (2021). Women's empowerment and gender equality in agricultural value chains: Evidence from four countries in Asia and Africa. *Food Security*, *13*(5), 1101–1124. https://doi.org/10.1007/s12571-021-01193-5

Quisumbing, A. R., Meinzen-Dick, R., Raney, T. L., Croppenstedt, A., Behrman, J. A., & Peterman, A. (2014). Closing the knowledge gap on gender in agriculture. *Gender in Agriculture: Closing the Knowledge Gap*, 3–27.

Ragasa, C., Malapit, H. J., Rubin, D., Myers, E., Pereira, A., Martinez, E. M., Heckert, J., Seymour, G., Mzungu, D., & Kalagho, K. (2021). *" It takes two": Women's empowerment in agricultural value chains in Malawi* (Vol. 2006). Intl Food Policy Res Inst.

Raney, T., Anríquez, G., Croppenstedt, A., Gerosa, S., Lowder, S. K., Matuschke, I., & Skoet, J. (2011). *The role of women in agriculture*.

Sen, A. (1999). Commodities and capabilities. *OUP Catalogue*.

Sharma, R. R., Chawla, S., & Karam, C. M. (2021). Global gender gap index: World economic forum perspective. In *Handbook on diversity and inclusion indices* (pp. 150–163). Edward Elgar Publishing.

Trommlerová, S. K., Klasen, S., & Leßmann, O. (2015). Determinants of empowerment in a capability-based poverty approach: Evidence from The Gambia. *World Development*, *66*, 1–15.

Women, U. (2015). *The cost of the gender gap in agricultural productivity in Malawi, Tanzania, and Uganda*.