

IFPRI Discussion Paper 02006

February 2021

"It Takes Two"

Women's Empowerment in Agricultural Value Chains in Malawi

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Contents

ABSTRACT	v
ACKNOWLEDGMENTS	vi
ACRONYMS	vii
1. Introduction	1
2. Methods	4
2.1. WEAI methodology	4
2.2. Quantitative methods	8
2.2.1 Sampling approach (focusing on non-formal training)	8
2.2.2 Description of survey content	12
2.2.3 Enumerator training and data collection	12
2.2.4 Ethics and compensation	12
2.3. Qualitative methods	13
2.3.1 Sampling approach	13
2.3.2 Researcher training and data collection	13
2.3.3 Description of qualitative interview guides	14
3. Characteristics of the survey sample	15
4. Program implementation	18
4.1. Program implementation: Perspectives from agricultural training centers	18
4.2. Program satisfaction and benefits: Perspectives from graduates	20
4.3. Program's approach on agribusiness management skills	22
4.4. Program outcomes	23
4.4.1 Benefits of training	27
4.4.2 Challenges to implementation of training lessons	28
5. Empowerment	32
5.1. Women's Empowerment Index in Agriculture (Pro-WEAI)	32
5.2. Additional indicators for women's empowerment in value chains	38
5.3. Local environment influencing women's participation and empowerment	39
5.3.1 Access to reliable sanitation	39
5.3.2 Menstrual hygiene management	39
5.3.3 Sex and fertility agency	40
5.3.4 Sexual hostility and reputational concerns	41
5.3.5 Safety in the community	43
5.3.6 Spousal support	44
5.3.7 Gossip	44
5.3.8 Gendered treatment of entrepreneurs	45
5.3.9 Transportation and market access	45
6. Discussion	47
6.1. Program implementation	47
6.1.1 Program structure and implementation	47
6.1.2 Selection process of trainees	47
6.1.3 Training implementation	47
6.1.4 Improving value chain outcomes of the program	49
6.1.5 Promoting the household approach	49
6.1.6 Enabling local environment for women entrepreneurship	50
6.2. Women's empowerment	50
7. Conclusions	52
REFERENCES	53
ANNEXES	55

List of Tables

Table 1. Definition of pro-WEAI Indicators.....	6
Table 2. Additional indicators.....	7
Table 3. List of focus districts, participating colleges, target value chains and survey samples	9
Table 4. Types and number of respondents in the qualitative study.....	13
Table 5. Characteristics of the sample households in the survey.....	16
Table 6. Characteristics of sample respondents in the survey (% of sample individuals)	17
Table 7. Respondent satisfaction with training (% of individual graduates)	21
Table 8. Percentage of women graduates and non-graduates by business management practices	23
Table 9. Importance of vegetable VC in household income (% of sample households)	24
Table 10. Comparison of VC outcome indicators between beneficiary and non-beneficiary households..	25
Table 11. Percentage of households by reported changes in VC outcome indicators	26
Table 12. Pro-WEAI results.....	32
Table 13. Percentage of respondents by adequacy in pro-WEAI indicators.....	35
Table 14. Percentage of respondents by other value chain indicators	38
Table 15. Percentage of respondents by access to reliable sanitation.....	39
Table 16. Percentage of women respondents by menstrual hygiene management (women only).....	40
Table 17. Percentage of respondents by sex and fertility agency (% of respondents).....	41
Table 18. Sexual hostility in the working environment (% of respondents).....	42

List of Figures

Figure 1. Mixed method approach	4
Figure 2. Domains and indicators of the Pro-WEAI.....	5
Figure 3. Map of Malawi, prevalence of poverty per district, and focus districts	10
Figure 4. Contributions to disempowerment.....	33

List of Annex Tables

Annex Table 1. Modules included in the individual and household surveys.....	55
Annex Table 2. Respondent satisfaction with ATVET training among graduates and similar trainings among non-graduates	58
Annex Table 3. Percentage of respondents by self-efficacy statements	58
Annex Table 4. Percentage of respondents by input in productive decisions.....	59
Annex Table 5. Percentage of respondents by ownership of land and other assets	60
Annex Table 6. Percentage of respondents by access to and decisions on financial services	60
Annex Table 7. Percentage of respondents by control over use of income	61
Annex Table 8. Percentage of respondents by group membership and membership in influential groups	62
Annex Table 9. Percentage of respondents by entrepreneurial mindset	62
Annex Table 10. Pair-wise correlation analysis between selected VC outcomes and women's empowerment indicators.....	63

List of Annex Figures

Annex Figure 1. Percentage of respondents by indicators of autonomy in income.....	57
Annex Figure 2. Percentage of respondents by attitudes about intimate partner violence against women	57

ABSTRACT

Inclusive agricultural value chains (VCs) are potential drivers for poverty reduction, food security, and women's empowerment. This report assesses the implementation of the Agricultural Technical and Vocational Education Training for Women Program (ATVET4Women) that aims to support women with vocational training and market linkages in priority agricultural value chains. This report focuses on Malawi, one of the six pilot countries of the ATVET4Women; and focuses on vegetable value chains in which some non-formal training sessions have been conducted as of October 2019. This report presents (1) program experience of stakeholders; (2) evidence of program benefits and challenges among ATVET4Women non-formal training graduates; and (3) baseline data on value chain and empowerment indicators, using a pilot household survey-based instrument for measuring women's empowerment in agricultural value chains (pro-WEAI for market inclusion) and supplementary qualitative research. Results show graduates' satisfaction and appreciation of the training provided, and some graduates reported having access to more lucrative markets as a result of the training. However, positive changes in several outcome indicators were reported by only some graduates: 30 percent of graduates reported increased production and sales. There is no significant difference in the reported changes and levels of vegetable production and income between graduates and non-graduates. Qualitative findings suggest that constraints to accessing agricultural inputs and funds to upgrade their production may be why there are no measured differences. Results on empowerment status reveal that 73 percent of women and 85 percent of men in the sample are empowered, and 73 percent of the sample households achieved gender parity. The main contributor of disempowerment among women and men is lack of work balance and autonomy in income. Fewer women achieved adequacy in work balance than men. Adequacies in attitudes about domestic violence, respect among household members, input in productive decisions, and asset ownership are generally high for both women and men, but significantly lower for women. While this report is mainly descriptive and further analysis is ongoing, it offers some lessons and practical implications for improving ATVET4Women program implementation and its outcomes on women's market access, incomes, and empowerment.

Keywords: women's empowerment, gender, agricultural value chains, training, market access

ACKNOWLEDGMENTS

This work was undertaken as part of the Gender, Agriculture, and Assets Project Phase Two (GAAP2) and the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH). Funding support for this study was provided by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) [Grant number: 81239814], Bill & Melinda Gates Foundation (BMGF) [Grant number: INV-008977], and A4NH. This work was conducted in collaboration with AUDA-NEPAD, particularly Fati N’zi-Hassane, Unami Mpofo, Simon Kisira, Arshfod Ngugi, Andson Nsune, and Caroline Mutepfa, and GIZ, specifically Miriam Heidtmann and Steffen Becker, and the national program coordinator, Victoria Lonje. For their helpful comments on the draft report, we are grateful to the reference committee, Rita Bissoonauth, Joyce Cacho, Claudia Freudigmann (and sector program advisors Dana Leow and Lisa Peth), Markus Goldstein, Jemimah Njuki, and Frank Place, as well as synchronous and asynchronous participants in the validation workshop. We would like to thank our partner in the household survey implementation, Dr. Peter Mvula and the team at Wadonda Consult. We also thank IFPRI-Malawi, headed by Dr. Bob Baulch, for logistical support.

We are most grateful to the farmers, entrepreneurs, extension agents, government officials, private sector, principals, trainers, and educators who shared their precious time to talk to us about their experiences and stories.

We dedicate this work to the late Dr. Ephraim Chirwa, who led the team in Wadonda Consult, for his dedication and work in providing quality and rigorous evidence into policy design and implementation in Malawi.

The opinions expressed here belong to the authors, and do not necessarily reflect those of A4NH, AUDA-NEPAD, BMGF, CGIAR, GIZ, or IFPRI.

ACRONYMS

AEDC	Agricultural extension development coordinator
ATC	Agricultural training centers
ATVET	Agricultural Technical Vocational Education and Training
ATVET4Women	Agricultural Technical Vocational Education and Training for Women
AUDA-NEPAD	African Union Development Agency-New Partnership for Africa's Development
A-WEAI	Abbreviated Women's Empowerment in Agriculture Index
B&L	Blantyre and Lilongwe
CAADP	Comprehensive Africa Agriculture Development Programme
DADO	District Agricultural Development Officer
DHH	Dual-adult household
EPA	Extension Planning Area
FGD	Focus Group Discussion
GAAP2	Gender, Agriculture, and Assets Project, Phase 2
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GPI	Gender Parity Index
IFPRI	International Food Policy Research Institute
IPV	Intimate Partner Violence
MVS	Mikolongwe Vocational School
MoAIWD	Ministry of Agriculture, Irrigation and Water Development
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental Organization
Pro-WEAI	Project-level Women's Empowerment in Agriculture Index
Pro-WEAI+MI	Pro-WEAI for Market Inclusion
SAFI	School of Agriculture for Family Independence
TVET	Technical, Vocational Education and Training
TEVET	Technical, Entrepreneurial and Vocational Education and Training
TEVETA	Technical, Entrepreneurial and Vocational Education and Training Authority
USAID	United States Agency for International Development
VC	Value Chain
WEAI	Women's Empowerment in Agriculture Index
WOH	Woman-adult-only household
3DE	3 Domains of Empowerment DHH, WOH, B&L

1. INTRODUCTION

Inclusive agricultural value chains are potential drivers for economic growth, poverty reduction, food security, and women's empowerment. As part of the African Union's commitment to achieving these goals, the African Union Development Agency-New Partnership for Africa's Development (AUDA-NEPAD) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) have implemented the Agricultural Technical Vocational Education and Training for Women (ATVET4Women) Program as a gender-sensitive approach to technical training and market linkages in priority agricultural value chains. ATVET4Women is part of a larger project called Promotion of Technical Vocational Education and Training for the Agricultural Sector in Africa (ATVET) led by AU-NEPAD and GIZ.

The ATVET Program was launched in 2014 in Benin, Ghana, Kenya, and Malawi. In 2015, GIZ commissioned a study to look at women's engagement in its ATVET Program. It found widespread gender imbalances in enrollment of both formal and non-formal trainings at training institutes (GIZ 2016). Women students are more likely than men to drop out of school due to family demands and marriage, and are more likely to face stereotypes, bullying, and gender-based violence (STEP 2018; Thomson Consult International 2017; GIZ 2016). Most technical institutions do not have adequate and appropriate facilities to support women's training needs. These students also lack mentors and role models to motivate and inspire them to face the challenges in technical institutions (STEP 2018; Thomson Consult International 2017; GIZ 2016). An inclusive approach to facilitating the development of relevant skills for decent work, especially through technical and vocational education and training (TVET) using formal and non-formal learning techniques, is key to the empowerment of women entrepreneurs. This understanding is the rationale for ATVET4Women, which rests on supporting rural women in African countries to acquire skills so that they can benefit from increased participation in economic activities in the agricultural and food sector. The ATVET4Women Program was officially launched in May 2017 in six pilot countries to reach and economically empower a total of 6,000 women farmers and entrepreneurs in the following three years.

In Malawi, public community technical colleges do not offer agriculture-related courses; such courses are offered by only a few private vocational and technical colleges (GIZ Appraisal Mission Report 2016). School enrollment ratios between boys and girls are relatively even in primary school, but gender gaps increase significantly in secondary education. Access to Technical, Entrepreneurial, and Vocational Education and Training (TEVET) is very low, with only 3 percent of secondary school graduates enrolling in these colleges (GIZ 2016). Young women's enrollment is particularly low but is slowly increasing; as of 2017, it was 32 percent of total enrollment as a result of an affirmative action policy administered by the TEVET Authority (STEP 2018; GIZ 2016). A gender analysis of ATVET in Malawi also showed gender-based constraints faced by women farmers and entrepreneurs (Thomson Consult International 2017). The report found that, compared to men, women have lower literacy rates, are less likely to receive training and extension services, and have limited access to inputs and other resources to start or expand a business (GIZ 2016; Thomson Consult International 2017).

Malawi is one of the six pilot countries for ATVET4Women, which was officially launched in Lilongwe in October 2018. There are two important features of the ATVET4Women in Malawi. First, it adopts a household approach¹ that encourages household members to share responsibilities and joint decision-making for farm and home-related management decisions (Farnworth et al. 2018; IFAD 2014). This household approach has also been used by the Ministry of Agriculture, Irrigation and Water Development (MoAIWD), the National Smallholder Farmers' Association of Malawi (NASFAM) and other organizations (Farnworth et al. 2018; IFAD 2014). The basic philosophy of ATVET4Women is that "it

¹ Also called a household-based approach or household methodologies and often used interchangeably with the concept of gender-transformative approaches by ATVET4Women.

takes two” to attain improved outcomes. The program has targeted both a woman and a man within a household for skills development in entrepreneurship in agricultural value chains while addressing power relations within the household to reduce gender gaps. Existing qualitative evidence shows that the household approach has increased women’s empowerment in Malawi (Farnworth et al. 2018); recent quantitative evidence shows that joint access to information and extension services to both men and women within a household is associated with improved technology adoption and development outcomes compared to solely promoting women’s or men’s access (Ragasa, Aberman, and Mingote 2019; Van Campenhout, Spielman, and Lecoutere 2018; Lambrecht, Vanlauwe, and Maertens 2016). Second, ATVET4Women in Malawi works with existing agricultural training centers or community colleges and aims to build their capacity to provide the trainings.

ATVET4Women has two main components: formal training and non-formal training. The formal training consists of a two- to three-year vocational and technical course at a participating agricultural training center (ATC). This program equips students with skills (and a diploma) for employment or entrepreneurship in the sector. The non-formal training, consisting of one to three weeks of short training courses, aims to use the curriculum and training modules for skills development in agricultural value chains for the nearby farming communities. The non-formal program aims to provide farmers with training on good production and business management practices. The courses encourage farmers to increase their incomes by diversifying their production, shifting from maize or tobacco to higher value commodities. The initial priority value chains to be promoted were aquaculture, mango, pineapple, and vegetables. As of February 2020, formal training has not yet started in Malawi, owing to the length of time needed for curriculum development and approval. The non-formal training started in 2018 using preexisting training materials on vegetable production. No study has yet assessed the outcomes of this training.

In 2019, a partnership was established between the International Food Policy Research Institute (IFPRI) and AUDA-NEPAD with the support of GIZ to measure the empowerment and value chain outcomes of ATVET4Women activities by piloting a survey-based instrument called the pro-WEAI for market inclusion (pro-WEAI+MI). The instrument is based on the Women’s Empowerment in Agriculture Index (WEAI), a standardized, recognized approach for measuring women’s empowerment, originally developed by IFPRI, the Oxford Poverty and Human Development Initiative, and the United States Agency for International Development (USAID) (Alkire et al. 2013). Pro-WEAI+MI uses the project-level version of the WEAI (pro-WEAI) as a starting point and adds relevant components to capture empowerment across multiple nodes of the value chains of interest. It uses both quantitative and qualitative instruments to assess women’s empowerment, and it has been piloted in two settings in Asia—in Bangladesh and the Philippines (Ahmed et al. 2018; Malapit et al. 2019). As the pro-WEAI+MI is still under development, the quantitative sections of this report will focus on pro-WEAI plus a suite of candidate value chain indicators.

This report serves three purposes: (1) to document the implementation of the non-formal ATVET4Women in Malawi, (2) to assess the value chain and empowerment outcomes of the program (as of January 2020), and (3) to provide a baseline for the current phase of the ATVET4Women program.² The following research questions are explored in this report:

- What are the experiences of graduates in the ATVET4Women program?
- What are the experiences and feedback from various actors on program implementation and areas for improvement?
- What is the status of women’s and men’s empowerment in the sample? What are the main

² While an assessment of program outcomes was initially envisioned for the study, the delay in the implementation of many program activities and the small number of graduates (121 graduates as of October 2019) limit rigorous quantitative evidence for program impacts; thus, this study remains qualitative and indicative of program outcomes.

sources of disempowerment among women and men in the sample?

- How do individuals who are involved in agricultural value chains experience (and understand) empowerment and disempowerment? And how does this understanding inform best practices for the measurement of empowerment among those operating in agricultural value chains?
- What enabling and constraining factors affect women's participation and empowerment in agricultural value chains, particularly the vegetable value chain, in the sample?
- How does ATVET4Women enhance women's livelihoods across agricultural value chains and provide opportunities for women to empower themselves?

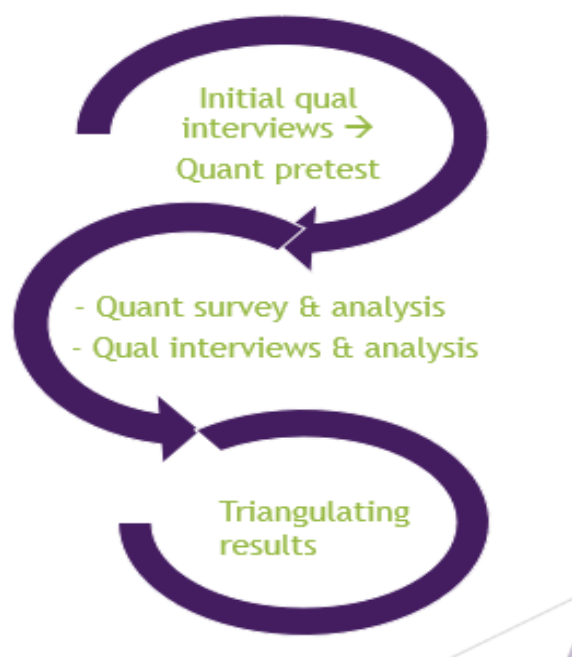
While this report is mainly descriptive and further analysis is ongoing, it identifies some lessons and practical implications for improving ATVET4Women program implementation and its outcomes related to women's market access, incomes, and empowerment.

The rest of the report is structured as follows. Section 2 describes the methodology. Sections 3–5 describe the survey sample, summarize the results on program implementation and value chain outcomes (as of January 2020), and present the status of women's and men's empowerment. Section 6 discusses the implications of the results for ATVET4Women program. Last, section 7 presents concluding remarks.

2. METHODS

The work presented in this report is the result of a mixed-methods study (Figure 1). In employing a mixed-methods approach, we conducted cognitive interviewing on selected survey modules.³ Cognitive interviewing is a qualitative approach for identifying sources of error in how respondents interpret and formulate responses to survey questions, so that their responses accurately reflect their experiences (Willis 2004). We used the findings from the cognitive interviewing study to refine new modules that are being developed as part of this study. We also adapted existing GAAP2 qualitative protocols⁴ to address gendered dimensions around participation, benefits, and empowerment at different nodes of selected value chains that were targeted by the ATVET4Women Program (see section 2.3). Next, we collected data using both the quantitative and qualitative instruments, providing us a rich pool of data and analytical power that would not be available using any of these methods individually. This report triangulates the results from the quantitative and qualitative studies, allowing us to identify meaningful insights into the ATVET4Women Program and women's engagement in agricultural value chains.

Figure 1. Mixed method approach



2.1. WEAI methodology

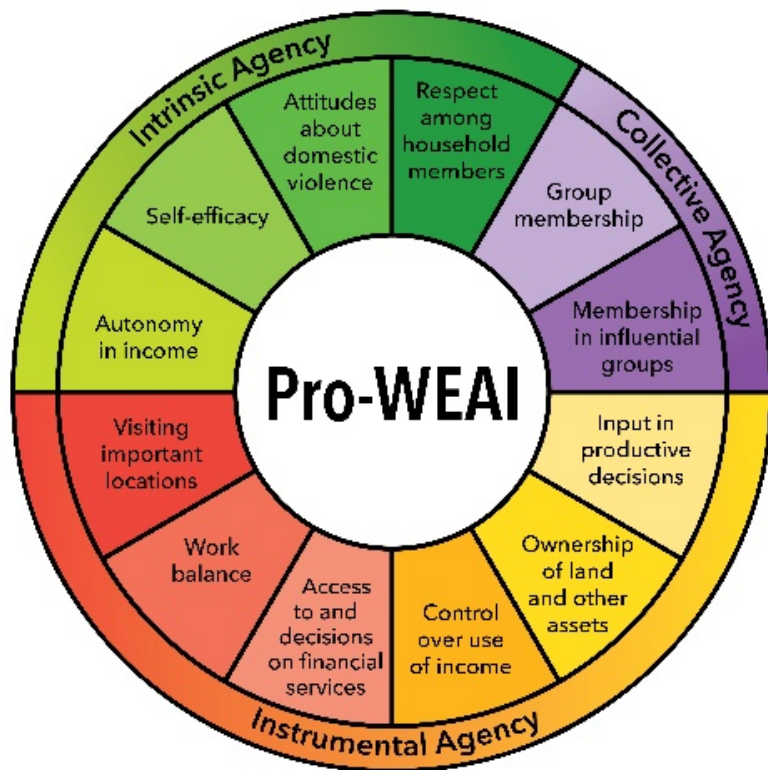
This study is part of an effort to develop pro-WEAI for market inclusion, which builds on the pro-WEAI, a survey-based tool to measure women's and men's empowerment and inclusion in agricultural development projects (Malapit et al. 2019). Unlike other empowerment measures (e.g., measures based on the Demographic and Health Surveys), which do not typically cover both men and women, pro-WEAI allows for direct comparison between women and men in the same household. The index is comprised of two sub-indices: (1) the Three Domains of Empowerment index (3DE) and the Gender Parity Index (GPI). The 3DE aggregates women's and men's achievements across 12 equally-weighted indicators that measure three types of agency: intrinsic, instrumental, and collective (Figure 2). Indicators of intrinsic agency are autonomy in income, self-efficacy, attitudes about intimate partner violence (IPV) against

³ The results of the cognitive interviewing study are reported elsewhere (Myers et. al. In development).

⁴ The full protocols are available at <http://weai.ifpri.info/files/2018/04/GAAP2-Qualitative-Protocols-no-comments-.pdf>.

women, and respect among household members; indicators of instrumental agency are input in productive decisions, ownership of land and other assets, control over use of income, access to and decisions on financial services, freedom of movement and work balance; indicators of collective agency are group membership and membership in influential groups.

Figure 2. Domains and indicators of the Pro-WEAI



Source: Malapit et al. (2019).

In this study, we revisited indicators that were established in the pilot version of pro-WEAI and adjusted some indicator definitions, incorporating the results from cognitive interviews and lessons learned from other ongoing pro-WEAI efforts. While pro-WEAI includes 12 indicators across three domains of agency (intrinsic agency, instrumental agency, and collective agency), the current pro-WEAI for market inclusion incorporates only 11 of the 12 indicators. The missing indicator, freedom of movement, is meant to capture whether individuals can freely choose to move about within their communities and to neighboring communities and is currently undergoing further validation. Compared to the pro-WEAI, the adequacy cutoff has changed for two indicators: asset ownership and self-efficacy, both reflecting improvements in implementation relative to previous efforts.⁵ Table 1 provides the definitions and adequacy cut-offs for each indicator. The GPI compares the achievements of women and men in the same household (for dual-adult households only).

⁵ We have updated the definition of ownership of land and other assets – adequacy is now defined as owning land or any three assets. For the self-efficacy indicator, the cognitive interviewing study in July 2019 revealed that respondents had trouble differentiating options on a five-point response scale (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree), i.e. could not differentiate between *agree* and *strongly agree* or *disagree* and *strongly disagree*. Responses were then reduced to a three-point scale (agree, neither agree nor disagree, disagree), and the adequacy threshold was changed to agreeing with the majority (at least five out of eight) of statements.

Table 1. Definition of pro-WEAI Indicators

Indicator	Explanation	Definition of adequacy
<i>Intrinsic agency</i>		
Autonomy in Income	Regarding income, it is a measure of the internal and external motivations that determine a person's decisions.	More motivated by own values than by coercion or fear of others' disapproval: Relative Autonomy Index score ≥ 1
Self-efficacy	Belief in one's own abilities to succeed in certain situations or accomplish tasks	Agreement on at least 5 out of the 8 statements
Attitudes about intimate partner violence against women	What is your opinion on the acceptability of a husband beating his wife in different situations?	Believes husband is NOT justified in hitting or beating his wife in all 6 scenarios: 1)She goes out without telling him 2)She neglects the children 3)She argues with him 4)She refuses to have sex with him 5)She applies for a new job or engages in a new livelihood without his consent 6)She burns the food
Respect among household members	How do you feel about some of other people in your household or family group and how do you think they feel about you?	Meets ALL of the following conditions related to another household member: 1)Respondent respects relation (MOST of the time) AND 2)Relation respects respondent (MOST of the time) AND 3)Respondent trusts relation (MOST of the time) AND 4)Respondent is comfortable disagreeing with relation (MOST of the time)
<i>Instrumental agency</i>		
Input in productive decisions	What decisions are you a part of? What is your role in making these decisions?	Meets at least ONE of the following conditions for ALL of the agricultural activities they participate in 1)Makes related decision solely, 2)Makes the decision jointly and has at least some input into the decisions 3)Feels could make decision if wanted to (to at least a MEDIUM extent)
Ownership of land and other assets	Do you own any assets? Do you own them solely or jointly?	Owns, either solely or jointly, at least ONE of the following: 1)At least three assets 2)Land
Access to and decisions on financial services	Do you contribute to household decisions on credit (e.g. taking out a loan)? Can you get a loan if you wanted to? Do you have access to a financial account?	Meets at least ONE of the following conditions: 1)Belongs to a household that used a source of credit in the past year AND participated in at least ONE sole or joint decision about it 2)Belongs to a household that did not use credit in the past year but could have if wanted to from at least ONE source 3)Has access, solely or jointly, to a financial account
Control over use of income	Do you have input in decisions on how income and output from all ag activities you participate in is spent or used? Do you have input in decisions on how income from non-agricultural activities is spent?	Has input in decisions related to how to use BOTH income and output from ALL of the agricultural activities they participate in AND has input in decisions related to income from ALL non-agricultural activities they participate in, unless no decision was made
Work balance	How many hours a day do you work? How	Works less than 10.5 hours per day:

Indicator	Explanation	Definition of adequacy
	much of that time is spent on care giving for children?	Workload = time spent in primary activity + (1/2) time spent in childcare as a secondary activity
<i>Collective agency</i> Group membership	Are you a member of a group in your community?	Active member of at least ONE group
Membership in influential groups	Are you part of a group that is influential in your community? How influential is your group in the community?	Active member of at least ONE group that can influence the community to at least a MEDIUM extent

Note: Supplementary summary tables for the specifics of these key indicators are in Annex Tables 1 and 3–9 and Annex Figures 1–2.

To capture other dimensions of empowerment that are relevant to participation in agricultural value chains, we piloted additional indicators including (1) entrepreneurship mindset, (2) access to information, (3) sex and fertility agency, (4) access to reliable sanitation, and (5) sexual hostility in the work environments. Table 2 defines these additional indicators.

Table 2. Additional indicators

Indicator or group of indicators	Explanation
<i>Pro-WEAI indicators</i>	
Three domains of empowerment (3DE) score	One of the two sub-indices, weighted 90%, that make up pro-WEAI; an aggregate index that reflects women’s achievements across 12 indicators; reflects the percentage of women who are empowered and the intensity of disempowerment among women who have not achieved empowerment.
Disempowerment score	The inverse of the 3DE; an aggregate index that reflects the percentage of women who are disempowered and the intensity of disempowerment among women who have not achieved empowerment.
Percent achieving empowerment	The percentage of respondents who achieve empowerment based on achieving adequacy in 8 out of the 11 indicators
Gender-Parity Index (GPI)	One of the two sub-indices, weighted 10%, that make up the WEAI, A-WEAI, and pro-WEAI; an aggregate index that reflects gender parity; reflects the percentage of women in dual-adult households who are empowered or as empowered as the male in their household, and the average percentage difference in empowerment between men and women in households that have not achieved gender parity.
Percent achieving gender parity	The percentage of households in which the woman achieves empowerment, or if she is disempowered, her adequacy score is equal to or higher than the man respondent in the household.
Average empowerment gap	The average percentage difference in empowerment between men and women in households that have not achieved gender parity.
Pro-WEAI score	A score that reflects the absolute and relative proportion and depth of empowerment among women in the sample.
<i>Other VC-related indicators</i>	
Entrepreneurship mindset	Belief in one’s own abilities to succeed in certain situations or accomplish tasks
Access to information	Whether respondents received information on agriculture or markets from any source, including extension agents, radio, other media, training institutes, and friends and neighbors.
<i>Other indicators</i>	
Sex and fertility agency	Decision-making on a statement is defined as making the decision solely or jointly, and if making the decision jointly, having at least a medium level of input into the decision for statements on the number of children to have; whether to have another child; whether to use a contraceptive; if using a contraceptive, the type of contraceptive to use; and when to have sex. Statements were asked only when applicable.
Access to reliable sanitation	At the place of work, if respondents had a urination facility and a defecation facility that they found acceptable and safe, and a handwashing facility.

Indicator or group of indicators	Explanation
<i>Menstrual hygiene management</i>	
Menstruated in the last 6 months	Whether the respondent had their period in the past 6 months. The rest of the module was asked only to women who reported that they had menstruated in the past 6 months.
Change cloth/pad at work	Whether the respondent had an acceptable place to change their cloth/pad at work.
Dispose cloth/pad at work	Whether the respondent had an acceptable place to dispose their cloth/pad at work.
Acquire pad	Whether the respondent could acquire a pad if needed; among those who did not use reusable cloths.
Reusable cloth	Whether the respondent used reusable cloths.
Pain management during period	Those who experienced pain during their period were asked about ways they managed pain: medicine, hot water bottle, by working less, doing nothing, or other methods.
Missing work, school or social activities	Respondents were asked the frequency of missing work or if they ever missed school or a social activity, due to their period during their last menstrual period.
<i>Sexual hostility in the working environment</i>	
Never sexual hostility	Respondent's perception that others like them in the community do not experience sexual hostility in their working environment. Sexual hostility includes the following categories: unwanted attempts to establish a romantic or sexual relationship; sexual touching without consent; make you feel like you are being bribed to engage in sexual behavior; sexual propositions; threats for sexual non-cooperation.

We used quantitative methods, in the form of household survey, to measure empowerment and value chain outcomes, and qualitative methods, in the form of semi-structured interviews, to uncover the local meanings of these empowerment domains and provide insights to enrich the understanding of the results from the quantitative method.

2.2. Quantitative methods

We conducted a household survey to assess the value chain and empowerment outcome indicators of the ATVET4Women Program graduates and compare them to non-graduates. The household survey included both a household questionnaire and an individual questionnaire that was administered separately to both women and men.

2.2.1 Sampling approach (focusing on non-formal training)

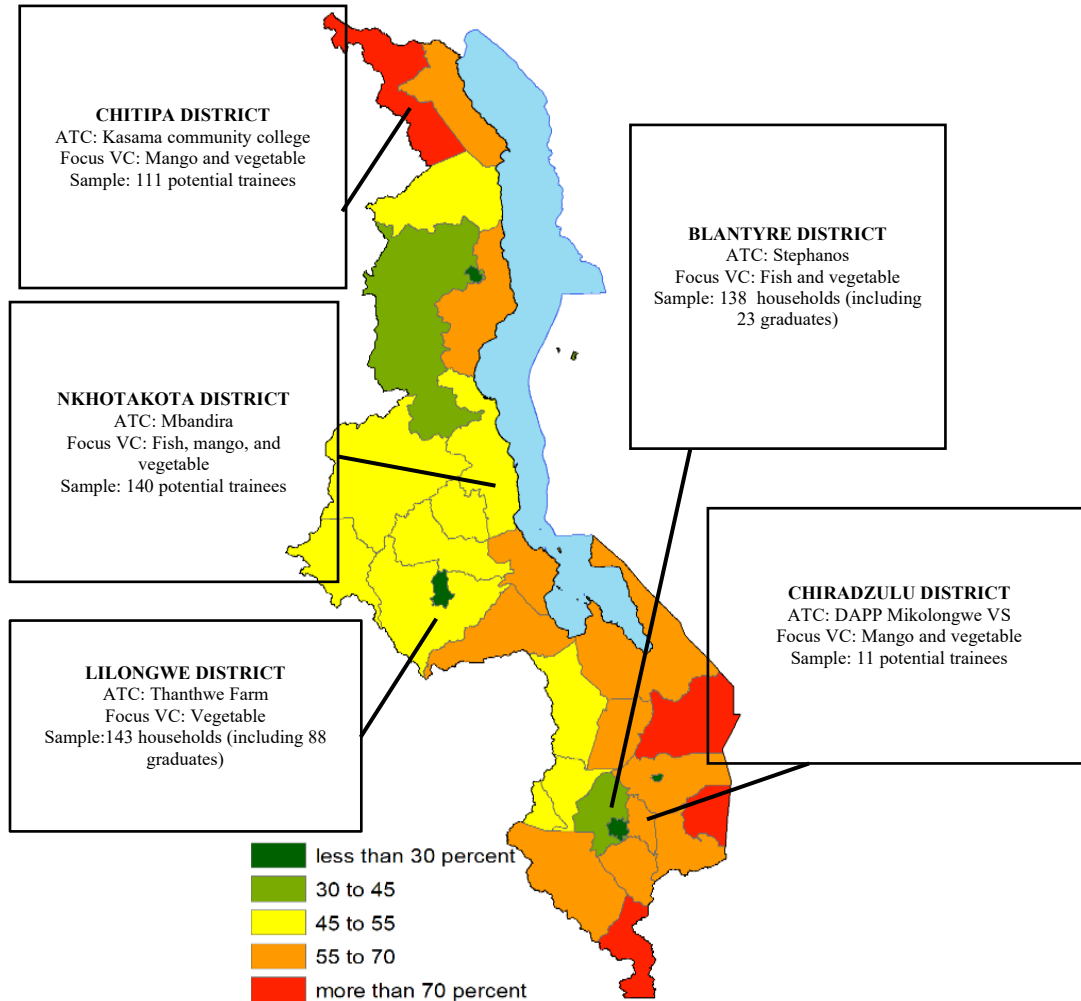
The household survey focuses on five districts where ATVET4Women has (1) started some activities, (2) shown initial commitment from a community college, and (3) shown a high likelihood to continue with the program. These districts are Lilongwe and Nkhotakota in the Central region, Chitipa in the Northern region, and Blantyre and Chiradzulu in the Southern region (Table 3). These districts cover different regions (north, central, south), agroecological zones, and socioeconomic profiles (Figure 3). The participating ATCs include Mbandira technical college in Nkhotakota, Thanthwe Farm in Lilongwe, Kasama community college in Chitipa, Stephanos vocational school in Blantyre, and Development Aid from People to People (DAPP) Mikolongwe Vocational School (MVS) in Chiradzulu. Each of these institutes has a community outreach program that works with nearby farmers. No formal linkages or informal relationships currently exist between these institutes and the government extension services.

Table 3. List of focus districts, participating colleges, target value chains and survey samples

District	Participating college/training institute	Initial target value chain activities for both formal and non-formal training	Reported number of graduates ^{/a}	Number of beneficiary households surveyed ^{/b}	Number of non-beneficiary households surveyed ^{/b}	Total number of households surveyed ^{/b}
Blantyre	Stephanos	Fish Vegetables	20	23	116	138
Chiradzulu ^{/c}	DAPP Mikolongwe vocational school (MVS)	Mango	3	0	11	11
Chitipa	Kasama	Vegetables Mango	0	0	111	111
Lilongwe	Thanthwe Farm	Vegetables	136	88	55	143
Nkhotakota	Mbandira	Mango Fish	0	0	140	140
Total			159	111	433	544

Source: ATVET4Women program document. ^{/a} List provided by the national program coordinator; most graduates are from the ATVET4Women program, while nine graduates from Blantyre and two graduates are through the earlier ATVET Program. ^{/b} From IFPRI/Wadonda survey (2019). The actual number of surveyed graduates was lower due to duplications in the names of graduates and challenges in tracing some of the graduates from the original list. For Blantyre, the number of surveyed graduates was actually higher than those in the original list. This was because additional names of ATVET4Women graduates were subsequently given by the main instructor of Stephanos. ^{/c} Lower sample size as the participating institute was not available to participate in the survey within the survey period.

Figure 3. Map of Malawi, prevalence of poverty per district, and focus districts



Source: Map generated from Malawi Integrated Household Survey-4 data and report, http://www.nsomalawi.mw/images/stories/data_on_line/economics/ih4/IHS4/IHS4%20REPORT.pdf.

The study focuses on the experiences of beneficiaries and stakeholders in the program, challenges they face, perceptions on areas of improvement for the program, and changes in outcome indicators as a result of the program. The starting point for the data collection is the list of graduates from the initial nonformal trainings facilitated by ATVET4Women in 2018–19. In Lilongwe, the list contains 124 graduates of vegetable production trainings and another 12 graduates of the entrepreneurship management course. The survey team was able to track 88 of these graduates for the survey. In Blantyre, the list includes 17 graduates who were trained in aquaculture and mango and vegetable production, and another three graduates trained in entrepreneurship management. The survey team was able to locate these 20 graduates, and an additional 3 claimed to be graduates but were originally not in the list provided by the

program. In Chiradzulu, 3 graduates were listed, but the survey team could not locate them. No graduates were listed in Nkhotakota and Chitipa. Respondents in Chitipa were reported to have been trained by ATVET4Women, although the national program coordinator confirmed that ATVET4Women has not yet started there, and respondents were referring to another GIZ-funded project.

We assess program implementation and its indicative program outcomes by comparing those of households with at least one graduate (hereafter referred to as beneficiary household) and a comparable group of households with potential trainees. The comparison group is a group of people who, in the absence of ATVET4Women training, would have similar characteristics to those who received the training. The main challenge, however, was finding a comparable group. In reality, individuals who are exposed to the training differ from those who are not, as described in Section 3 below (Table 5). The case of ATVET4Women is even more challenging because the program is just starting. The program has not yet been introduced to potential partners in most of the participating colleges, clear selection criteria for potential trainees for the different value chains have yet to be identified, and the process used to select participants for the initial trainings done in Lilongwe and Blantyre was unclear.

At the time of the survey, information from the national program coordinator and principals of the participating colleges/institutes indicated two types of potential trainees for the non-formal training: (1) lead farmers, defined as those farmers selected by the community and trained on specific technologies to train other farmers in the nearby areas surrounding the college/institute; and (2) existing farmers or farmers' groups that the colleges or institutes are already working with in their community outreach. A list of existing lead farmers in one Extension Planning Area (EPA) where each of the participating colleges/institutes is located was obtained from government extension officers either at the EPA office or the District Agriculture Development Office (DADO) in the respective districts. A list of farmers currently working with the colleges/institutes was also obtained from the principals. The lists from the principals were stratified using the gender of the lead farmer or existing trainees to oversample women farmers given the program's focus on women's inclusion.

The available budget allowed us to target a total of 140 households (both graduates and non-graduates) per district (a total of 700 sample households for the whole survey). The actual sample size was smaller because the number of graduates was much smaller and because the time spent in the sensitization process among key stakeholders in the focus districts, listing households, and getting farmers' and other key stakeholders' cooperation in the survey increased both the duration of field work and field costs. In particular, major challenges were experienced in Chiradzulu district to obtain the cooperation of the participating college, and the list of lead farmers from the DADO and EPA agricultural extension development coordinator (AEDC) was out of date. Therefore, the survey team and national program coordinator decided not to continue with that district and focused the survey efforts in the other districts.

The actual sample size is 544 households. Table 3 shows the distribution of sample households by district. Households of all ATVET4Women graduates (i.e., beneficiary households) were included in the sample; households of all identified women lead farmers and existing college farmer-trainees were also included; and the rest were randomly selected households from the lists. For the beneficiary households, the graduates were interviewed, and another primary decision-maker of the opposite sex was identified and interviewed. For non-beneficiary households, primary female and male decision-makers were identified and interviewed. A total of 938 women and men were included in the sample. In the following sections, we present the results of both (1) beneficiary households, defined as those with at least one graduate within the household, versus non-beneficiary households; and (2) individual graduates versus non-graduates. For the former, we assume that there is spillover and sharing of information from the training within the household; therefore, a training attended by one member of the household may also have affected knowledge and practices by the other members of the household. The summary tables in the

next sections are generally structured to present (1) baseline data for the 5 districts (ALL); and comparison between beneficiary and non-beneficiary households and between graduates and non-graduates in Blantyre and Lilongwe only, two districts where trainings have been conducted, for better comparability.

2.2.2 Description of survey content

The survey consisted of both a household questionnaire and an individual questionnaire that was administered separately to the target woman and target man in the household. The household questionnaire contains basic information on household size and household members, land and crops cultivated, assets, and details on the value chains, including costs and labor. It was administered through a face-to-face interview with the most knowledgeable members and/or primary decision-maker within the household over the course of, on average, one hour. The individual questionnaire contains information on the participation and experience in the ATVET4Women program, other trainings and extension services, pro-WEAI modules and several new modules that were being piloted as part of the development of pro-WEAI for market inclusion. It was administered to the primary woman and man decision-makers (interviewed separately) for about one hour and 15 minutes each on average. Specific modules and their content are listed in Annex Table 1. The questionnaires reflected changes based on results from cognitive interviewing conducted two months prior to the start of the enumerator training for the survey. Cognitive interviewing has been a standard approach to developing WEAI instruments (Malapit, Sproule and Kovarik 2017; Hannan, Heckert, et al. 2019). Annex Table 1 mentions which modules were revised as part of cognitive interviewing.

2.2.3 Enumerator training and data collection

Wadonda Consult Ltd., which was selected through a competitive bidding process, implemented the household survey from September to October 2019. A total of 13 women and 13 men were trained to be enumerators for the household survey. Enumerator training was conducted in September 2019 by the IFPRI team. It included five days of classroom-based work and one day of piloting. The training covered project background information, ethics, obtaining informed consent, interviewing techniques, and detailed discussions of the questionnaires. All enumerators spoke Chichewa, the language used for the survey. Some also spoke Lambya, a language spoken in Chitipa. During the training, translations were discussed and clarified to ensure consistency across language groups.

The survey was administered using tablets and a computer-assisted personal interviewing software called SurveyCTO on which the interviewers were trained. As the data were collected, they were stored on a secure cloud-based server so that they were accessible to the research team for data checks.

2.2.4 Ethics and compensation

This study and all of its procedures was approved by the Institutional Review Board of IFPRI as well as the ethics board of the National Committee on Research in the Social Sciences and Humanities in Malawi. The quantitative enumerators and qualitative interviewers all received training on research ethics, including the process for seeking informed consent. Prior to being interviewed, all participants provided oral informed consent. Separate consent was sought for qualitative interviews and focus groups that were audio recorded. Consistent with standard practice, each household in the quantitative household survey was offered a 1 kg of sugar and 5 tablets of soap amounting to USD2, after the interview in appreciation for their time. For the qualitative study, participants were given 1 kg of sugar as compensation.

2.3. Qualitative methods

2.3.1 Sampling approach

The qualitative work draws from a sample of adult men and women in (1) a treatment group of households where adult women have participated in the ATVET4Women Program in Lilongwe and Blantyre, where some non-formal training sessions have started, and (2) a comparison group drawn from women who have not yet participated in any trainings but who may eventually be eligible to participate in the ATVET4Women program. All qualitative study participants were interviewed following a semi-structured guide. Other stakeholders were also interviewed, including entrepreneurs in agribusinesses related to the targeted crops, ATVET4Women instructors, and others familiar with the need for agricultural skills in Malawi. Table 4 shows the number of interviews completed by respondent type in each location. In addition, several other key informants were interviewed by the field team during the cognitive interviewing and household survey preparations including the three principals and six instructors in the other three participating ATCs (MVS, Kasama and Mbandira), three DADOs, three AEDCs, and three agricultural extension development officers in the other three focus districts (Chitipa, Chiradzulu and Nkhotakota). These interviews provided additional stakeholders' perspectives on the program implementation.

Table 4. Types and number of respondents in the qualitative study

Type of Respondent	Lilongwe	Blantyre	Total Completed
Women graduates - producers	8	5	13
Husbands of the women graduates - producers	5	4	9
Women non-trainees - producers	6	6	12
Women graduates - entrepreneurs (processors and traders)	2	3	5
Instructors	4	4	8
Other stakeholders (private sector, National Council for Higher Education, TEVETA, DADO, NGO/INGO)	2*	1	3
Agriculture Extension Officer	1	0	1
Total	28	23	51

Note: * These two interviews were conducted during the field pilot.

2.3.2 Researcher training and data collection

A five-day training workshop was held for the interviewers, which covered central issues in qualitative research data collection and gender analysis of agricultural value chains. The consent process, ethics, and compensation were also addressed (Section 2.2.4). The participants included three researchers, all of whom had previous experience conducting qualitative interviews and had previously worked with the ATVET4Women survey and/or cognitive interviewing activities. Their experience with the program gave them a strong foundation in the operation of the chosen value chains and strengthened the depth of content and quality of the interviews.⁶

⁶ The national coordinator of the ATVET program in Malawi, Victoria Lonje, was able to attend the full workshop, providing helpful details about the program and its participants, and contributing to the list of potential respondents.

During the training the research team and trainers developed and refined the interview guides for use in both English and Chichewa. Pilot interviews were conducted in and around Lilongwe to test the topics, length, and wording of the questions. Ultimately, six different interview guides were developed based on the categories of respondents, including: (1) women trainees and their husbands who are agricultural producers; (2) women who are agricultural producers but have not yet been trained; (3) women trainees who are entrepreneurs, either owning or managing agribusinesses in processing or trading, (4) instructors in the ATVET4Women program, (5) agriculture extension officers, and (6) other stakeholders.⁷

2.3.3 Description of qualitative interview guides

This study adapted the qualitative protocols prepared for IFPRI's work on the pro-WEAI,⁸ in combination with gender and agricultural value chain approaches (Rubin, Manfre, and Nichols Barret 2009) to address the gender dimensions of men's and women's participation, benefits, and empowerment at different nodes of the value chains that were targeted by the ATVET4Women program.

The list of topics and questions was revised several times and finalized during the workshop. In addition to confirming information about each respondents' relationship to the ATVET4Women program, the questions for trainees and potential trainings were organized around key themes including:

- Participation in and benefits of the ATVET program
 - Acquired skills and changes in attitude/behavior
 - Perceived benefits of the training
- Market integration
 - Acceptability of men's/women's participation in value chains
 - Position in the value chain
 - Upgrading
- Local understandings of empowerment
 - Decision-making
 - Group membership
 - Control over time
 - Safety and freedom of movement

Interview guides were finalized in English and translated into Chichewa (Annex 1). The qualitative research team carried out 51 interviews, approximately one hour each, as shown in Table 4 in Lilongwe and Blantyre Districts between November 2019 and February 2020. Interviews were recorded and supplemented by written notes. Verbatim transcripts were simultaneously translated into English and transcribed. We first coded the transcripts and notes for common themes and then used these codes to complete a content analysis. Transcript sections that demonstrated relevance of the key research themes on local concepts of empowerment, participation in different value chains, barriers to entry, patterns of decision-making, and perspectives on opportunities for the next generation, among others, were examined using thematic analysis.

⁷ A seventh guide for mentors was developed but not used, as the mentorship program had not yet started.

⁸ The pro-WEAI qualitative protocols are available at <https://weai.ifpri.info/files/2018/04/GAAP2-Qualitative-Protocols-no-comments-.pdf>.

3. CHARACTERISTICS OF THE SURVEY SAMPLE

A total of 544 households were surveyed in five focus districts, of which 111 households were ATVET4Women beneficiaries, defined as having any member of the household receiving non-formal training from the program. Table 5 shows the characteristics of the sample households. The average household size was five to six members for dual-adult households (DHHs) and four members for women-adult-only-households (WOHs), similar to national rural averages. Respondents were mainly farmers who cultivated an average of 1.7 hectares of land area in the last 12 months (for DHHs) and 0.8 hectares for WOHs. Three-fourths of land cultivated were owner-operated and 21 percent were rented. Being dependent on agriculture for their livelihoods, the majority of the households experienced serious shocks (e.g., drought, flood, storm, and crop pests and diseases) that affected their farming in the 12 months before the survey. Injury, illness, or death of a household member were other sources of serious shocks to the household.

Almost all households own their dwelling. A community borehole was the most common source of water for general household use, followed by pond/river/canal, community pipe, or uncovered well. Major sources of water for farming, particularly vegetables, were wells and rivers or streams. Only 3 percent of households reported having access to electricity. Most households reported having some small livestock and poultry (average of 10 livestock units per household), but almost none had large livestock (average of 0.3 units per household).

The majority of the sample households reported that crop farming was their main livelihood or most important income-generating activity. The majority of households (75 to 77 percent) were mainly engaged in maize and vegetable production, and most sample households engaged in both. Most households produced at least one type of green leafy vegetable, mainly for home consumption. Aside from leafy vegetables, tomato was the most popular vegetable crop, grown by almost half of the sample households (60 percent of households in Lilongwe). The second most popular vegetable crop was onion, grown by 15 percent of sample households (27 percent of households in Lilongwe). A total of 40 percent of households were also involved in legume production in addition to maize and/or vegetables, and 27 percent were involved in mango production. In the last decade, numerous government and non-governmental organization (NGO) projects have promoted crop diversification as both a climate change adaptation and income-generation strategy. While maize is still the dominant crop in the study sites and the rest of the country in terms of acreage, our data show much more diverse crops being grown by farmers.

In Blantyre and Lilongwe, where the trainings have been conducted, we see some differences between beneficiary and non-beneficiary households. Beneficiary households cultivated more land and own fewer livestock units. More beneficiary households are in the asset-poorest quintile, whereas there are more non-beneficiary households in the asset-richest quintile. Similarly, beneficiary households have fewer rooms in their dwelling, a commonly used measure of dwelling deprivation, than nonbeneficiary households. Almost all beneficiary households grow vegetable and maize, and about half of them include legumes; whereas we observe fewer non-beneficiary households cultivating maize and legumes.

The average age of respondents was 43 years for men and 38 years for women (Table 6). Restricting the districts to Blantyre and Lilongwe (where trainings have been conducted), graduates are generally younger than non-graduates in these districts. The majority of the respondents (88 percent of men and 96 percent of women) had no formal schooling or attended only primary school. The majority of the DHHs (86–89 percent) were monogamous households. Almost all women and men respondents participated in staple farming, mainly maize. Of the priority value chains (VCs) under ATVET4Women, 47 percent of men and 45 percent of women participated in vegetable VCs, across all focus districts. In Blantyre and

Lilongwe, more graduates than nongraduates participated in vegetable production. For mango, 23 percent of men and 20 percent of women participated in the mango VC, mainly in Chitipa district, and none in Lilongwe and Blantyre.

Table 5. Characteristics of the sample households in the survey

	All (5 districts) ^a		Beneficiary (B&L) ^b		Non-beneficiary (B&L) ^b		
	DHH	WOH	DHH	WOH	DHH	WOH	
Number of households	472	71	103	8	139	31	
Household size	5.76 (2.22)	4.14 (1.62)	5.36 (1.74)	4.25 (1.49)	5.56 (2.06)	3.68 (1.49)	
Crop land cultivated (ha)	1.69 (0.82)	0.79 (0.70)	1.01 (0.81)	0.81 (1.02)	0.74 (0.62)	0.63 (0.67)	***
Number of large livestock units (cattle/oxen)	0.33 (1.24)	0.08 (0.44)	0.09 (0.51)	0.00 (0.00)	0.22 (0.91)	0.00 (0.47)	
Number of small livestock units including poultry	9.72 (10.45)	7.63 (11.85)	6.17 (8.81)	1.75 (2.43)	9.94 (10.56)	8.68 (15.89)	***
Number of rooms	3.62 (1.30)	3.37 (1.46)	2.84 (1.17)	2.00 (1.20)	3.45 (1.03)	3.45 (0.99)	***
Owned dwelling (% of sample)	94.00	85.00	94.00	100.00	93.00	86.00	
Source of water for general use							
Community borehole	56.00	61.00	62.00	75.00	69.78	74.19	
Pond/River/Canal	14.00	11.00	25.00	13.00	12.95	16.13	**
Community pipe	11.00	15.00	0.00	0.00	0.00	0.00	
Well	8.00	10.00	7.00	13.00	7.19	6.45	
Has electricity (% of sample)	3.00	1.00	1.00	0.00	3.00	5.00	
Asset quintile							
First quintile (poorest)	17.00	23.00	33.00	38.00	12.00	23.00	***
Second quintile	17.00	18.00	27.00	38.00	22.00	13.00	
Third quintile	21.00	23.00	18.00	0.00	22.00	26.00	
Fourth quintile	21.00	17.00	14.00	25.00	19.00	13.00	
Fifth quintile (richest)	19.00	20.00	8.00	0.00	25.00	26.00	***
Experienced a serious shock in last 12 months (% of sample) ^c	84.00	77.00	84.00	75.00	88.00	77.00	
Participation in VC (% of sample)							
Maize	75.00	75.00	84.00	75.00	60.00	65.00	***
Vegetable production	77.00	61.00	96.00	100.00	83.00	65.00	**
Legumes (groundnut, soybean, etc.)	40.00	38.00	42.00	25.00	28.00	23.00	**
Mango production, including nursery	27.00	24.00	7.00	0.00	1.00	0.00	*
Pineapple production, including nursery	2.00	0.00	0.00	0.00	0.00	0.00	
Fish farming	1.00	0.00	0.00	0.00	0.00	0.00	

Source: IFPRI/Wadonda household survey (2019). Note: HH=household; DHH=dual-adult household; WOH=woman-adult-only household. Beneficiary households are defined as those with any member who was an ATVET4Women graduate. Values are percentages of the sample households, unless indicated otherwise. For continuous variables, values shown are the means, and values in parentheses are standard deviation. ^a Includes all 5 districts where the survey was conducted. ^b For comparability, we restricted the non-beneficiary households to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe); Statistically different at *10%, **5%, *** 1% level of significance. ^c The main shocks reported were crop losses due to drought, flood and other extreme weather events, income loss and medical expenses due to injury or illness of a household member, and increase in input prices.

Table 6. Characteristics of sample respondents in the survey (% of sample individuals)

	All (5 districts) ^{/a}		Graduate (B&L) ^{/b}		Non-graduate (B&L) ^{/b}	
	M	W	M	W	M	W
No. of observations	395	542	56	65	143	217
Age (years, average)	43 (13)	38 (11)	40 (12)	37 (10)	45 * (13)	40 * (12)
<i>Education level</i>						
No formal schooling or some primary	45	61	68	83	59 **	68 **
Primary school graduate	43	35	20	15	34 **	28 **
Secondary school graduate	10	4	9	2	6	4
Technical/vocational graduate	2	0	4	0	1	0
Dual-adult households	100	87	100	88	100	86
<i>Marital status</i>						
Married (monogamous)	90	77	89	80	91	74
Married (polygamous)	10	7	9	5	8	6
Divorced/Widow/Separated	0	16	0	15	0	20
Single	1	0	2	0	1	0
Participates in staple/maize farming	98	99	100	100	98	99
Participates in agriculture	99	100	100	100	99	100
Participates in agriculture and non-agriculture work	41	38	34	38	36	32
<i>Participates in priority value chain</i>						
Vegetable	47	45	89	82	66 ***	62 ***
Mango	23	20	0	0	0	0
Pineapple	0	0	0	0	0	0
Aquaculture	1	0	4	0	1	0

Source: IFPRI/Wadonda household survey (2019). The figures are percentages of the sample individuals, unless indicated otherwise. For continuous variables, values shown are the means, and values in parentheses are standard deviation. ^{/a} Includes all 5 districts where the survey was conducted. ^{/b} For comparability, we restricted the non-graduates to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe). “Graduates” pertain to individual graduates here; whereas “non-beneficiary” pertains to households (in Table 5). Table 6 counts the individual graduates in the second set of columns (graduates), and their spouses/partners not trained are included in the third set of columns (non-graduates). And since most households have only one graduate, there are individual non-graduates in the beneficiary HHs. This is the reason why there is discrepancy in the number of observations in Table 5 and Table 6. Statistically different at *10%, ** 5%, *** 1% level of significance.

4. PROGRAM IMPLEMENTATION

This section draws on data from the household survey, key informant interviews, and the qualitative study to describe (1) ATVET4Women program implementation from the perspectives of ATCs; (2) graduates' experiences, satisfaction, and perceptions of benefits derived from the program; and (3) program outcomes.

4.1. Program implementation: Perspectives from agricultural training centers

In this section, we focus on the program experiences of Thanthwe Farm and Stephanos, two of the five ATCs that have started some non-formal ATVET4Women training.

4.1.1 *Thanthwe Farm, Lilongwe*

Thanthwe Farm is a family-owned farming business that uses an integrated agricultural approach. It is located on a 40,000 square meter area in Likuni, about 20 kilometers from Lilongwe city. It was formally registered as an enterprise in 2013. The farm specializes in an integrated horticulture-livestock production. It produces high-value vegetables that include tomato, cauliflower, sweet pepper, onions, herbs, cucumber, lettuce, squash, and button mushroom, among others. The farm raises poultry and pigs, which also provide manure for vegetable cultivation. Both livestock products and vegetables are sold to supermarkets and individuals in Lilongwe. In addition to these farming activities, the couple who are the co-owners have also been involved in providing fee-based training to 24 other farmers as part of community outreach.

ATVET started discussions with Thanthwe Farm owners in 2015, and these two partners started joint activities in October 2018, with the launch of the ATVET4Women Program in Malawi. Thanthwe Farm was one of the key partners of ATVET4Women when the program was launched in Lilongwe. As the managing director shared,

ATVET4Women was critical in mobilizing the farmers and introducing the outgrower scheme and aggregation activities to Thanthwe. It started with an exchange program where I visited a women's agri-entrepreneurship center in Kenya, and that just opened my eyes to possibilities and opportunities. I said I wanted to do something to help women become successful entrepreneurs. (woman, managing director, Thanthwe Farm)

With the facilitation and mobilization of ATVET4Women, Thanthwe Farm mobilized the original 24 farmers to bring other farmers to be trained in vegetable production. A total of 136 farmers were mobilized and trained. The trainers were extension agents from the government and NGOs, under contract with Thanthwe Farm to deliver the training for a fee. ATVET4Women and Thanthwe Farm jointly contributed to training operating costs, payment for the trainers, and planting materials. The outgrower scheme started with farmers who were trained and provided with seeds, and with repayment through their harvest. Thanthwe Farm has undertaken to buy vegetables from the outgrowers so as to ensure an immediate market for the farmers' produce; however, the experience of outgrowers has not always been as expected. At times, some outgrowers had to look for other markets for their produce because Thanthwe Farm was not able to buy all produce from every outgrower. Some of the graduates reported selling their vegetables to ShopRite, a South African supermarket chain.

Currently, the formal arrangement between ATVET4Women and Thanthwe Farm is still developing, in terms of sharing of the training costs, provision of planting materials, payment of trainers, supporting facilities, investments in agroprocessing, and increasing market absorption of Thanthwe. Thanthwe Farm has submitted a proposal to ATVET4Women seeking investments for the upgrading of both Thanthwe

Farm's and other farmers' facilities and agroprocessing capabilities.

There was long gap in communication after the initial mobilization of farmers by ATVET4Women. Thanthwe Farm ended up paying most of the cost of the training conducted. With this new phase of the program, we hope that things will improve and that a formal contract will be finalized in order to have a clearer arrangement on cost-sharing and co-investments. (woman, managing director, Thanthwe Farm)

Thanthwe Farm and ATVET4Women used the household approach to champion joint decision-making in a household. During the training, this approach emphasized that business can succeed only if done jointly (by husband and wife). Initially, Thanthwe Farm did not explicitly invite at least two members (e.g., husband and wife) from each household to participate in the training. According to the managing director of Thanthwe, men generally needed time to accept that inviting their wives to participate was not threatening and was even beneficial. Some men, however, still want to protect their authority and control. Accordingly, Thanthwe Farm adjusted its strategy to emphasize the benefits of the household approach to anyone attending the training.

4.1.2 Stephanos, Blantyre

Stephanos is a private training institute based on Blantyre. It offers both a two-year formal vocational training and non-formal training through its community outreach program. The focus areas are mango, pineapples, and aquaculture production, processing, and marketing. Currently, the organization uses the DICLA (named for its creators) curriculum developed by a farm in South Africa..

ATVET4Women has started supporting Stephanos with external training for its instructors and the development of an agriculture-related vocational training curriculum (approval for which is still pending). ATVET4Women also conducted an institutional analysis to incorporate ATVET in Stephanos's strategic plan. ATVET4Women procured the materials for greenhouse cultivation even though Stephanos had not yet started using them. According to the principal, Stephanos is expecting the program to support it with the following:

- Memorandum of Understanding or formal contract between Stephanos and ATVET4Women as a roadmap for the role and responsibilities in the implementation of the ATVET4W program
- Processing equipment (e.g., jam and juice processors, driers) for demonstration during the training
- Other equipment (tractors, advanced technology for soil analysis, GPS, etc.) needed for training and demonstrations
- Capacity building through training for instructors, including building of expertise in the use greenhouse cultivation
- Linkages with industries (internships or attachments and business opportunities)

Stephanos recommended the following actions that ATVET4Women and Stephanos can do to include more women in the program:

- Provision of bursaries to women⁹
- Availability of infrastructure that is safe and secure for the youth (e.g., good changing rooms for young women)

⁹ Current fee is MWK165,000 with an exam fee of MWK19,250 plus other school necessities that amount to MWK100,000 (ID, sportswear, and administration fee).

- Exposure of trainees to role models and mentors
- Provision for career guidance
- Program for enabling the participation of mother with babies in trainings

Last, Stephanos suggested the following to improve the implementation of ATVET4Women:

- Better planning and adherence to schedules. In the past, implementation of agreed activities did not occur on schedule (some activities were supposed to be done in September 2019, but had not started by the time of the interviews in December 2019).
- Contractual agreements and a clear roadmap for the two partners are needed to guide the implementation of activities. In the past, activity implementation was always haphazard.
- Better coordination and regular communication. Without communication regarding visitation schedules, it is difficult for the institution to prepare and benefit from these site visits. ATVET4Women has visited the institution four times without prior notice.
- Monetary support to ATCs and various other stakeholders to assist with program implementation.

The lack of a clear roadmap, as well as the need to maintain regular communication and coordination among key stakeholders were echoed by the other participating ATCs (Kasama, Mbandira, and MVS) based on key informant interviews. These challenges were also apparent during the survey implementation. There was uncertainty, for example, about whether the list of graduates was correct and up to date, causing further delays in the field. In two of these ATCs (Mbandira and MVS), targeted for mango VC training, mango seedlings were reportedly given to the ATCs without clear instructions for care and cultivation or selection criteria for distribution.

The Program left MVS to distribute 700 seedlings to communities; MVS distributed to community heads to distribute to community; seedlings ended up with community heads. These seedlings were left for distribution without any information or instruction.... In addition, the mango seedlings were already withering. There was no proper planning and targeting of beneficiaries. (male, principal, MVS)

Instructors in Stephanos and Mbandira, targeted for aquaculture training, suggested the need to carefully select the trainees for aquaculture training. They said potential trainees should already be those engaged in aquaculture production, have a fishpond or land that can be converted to fishponds, or in the areas suitable for aquaculture and close to a source of water.

A principal and a DADO suggested that the program should perhaps revisit its own structure and financial and human resources to implement the program. They mentioned only one person (the program coordinator) visiting them and presumably running the whole program, which may not be adequate. They also mentioned the rare and sometimes unannounced site visits, which were all elements that did not benefit any of the parties involved.

4.2. Program satisfaction and benefits: Perspectives from graduates

A large majority of graduates (90 to 94 percent) were satisfied or very satisfied with the ATVET training provided (Table 7). These results are promising but vague. When asked about what improvements can be made to the training implementation, respondents suggested numerous items from more practical sessions and improving time management and use of local language to improved provision of training materials, transportation, food allowances, and covering a wider range of topics (including livestock production, beekeeping, agroprocessing, business management skills, nutrition, and climate change adaptation) (see

more details in section 6). As in the past, data from Malawi and elsewhere indicate generally very high ratings and satisfaction of farmers on training and extension services, mainly owing to extension's free provision (see Ragasa and Mazunda 2019; Spielman et al. 2019; Ragasa and Niu 2017; World Bank and IFPRI 2009). Similar trainings (non-ATVET training) received by non-graduates in Chitipa also got very high ratings from these respondents (Annex Table 2).

Table 7. Respondent satisfaction with training (% of individual graduates)

	All	Men	Women
<u>Training facilitation</u>			
Not satisfied	0	0	0
Somewhat satisfied	2	0	3
Neither satisfied nor dissatisfied	4	2	6
Satisfied	28	41	17
Completely satisfied	66	57	74
<u>Overall training implementation</u>			
Not satisfied	2	5	0
Somewhat satisfied	2	0	5
Neither satisfied nor dissatisfied	6	5	6
Satisfied	31	46	17
Completely satisfied	59	43	72
Number of observations	121	56	65

Source: IFPRI/Wadonda household survey (2019).

These results are also consistent with the qualitative study, showing that women graduates had positive experiences with ATVET4Women overall. The majority of women in the qualitative study stated they would recommend ATVET4Women to their relatives and to prospective entrepreneurs, largely for the same reasons. For instance, women shared that they would recommend the program because they want others to benefit as they have through increased income, enhanced knowledge of farming, and a higher standard of living. As two women shared,

I would encourage them because they would be encouraged from the training that I got. We learnt how to propagate mango trees, that is a viable business on its own if someone learns how to do that. (woman, Blantyre)

These trainings are also profitable for them. For someone who would like to venture into agribusiness must make sure he undergoes these trainings to understand some business aspects. In these lessons, they teach us that business can face challenges but it is important to endure. They also teach us how to access loans for the business. (woman, Lilongwe)

Qualitative interviews with husbands of women graduates also reported positive outcomes of the training, mostly about technical knowledge and skills they gained to improve their vegetable production, including new production techniques for vegetables, especially tomatoes and onions, and exposure to new, higher-value crops such as beetroot and cauliflower. They mentioned learning to select, care for, and sow seeds; apply fertilizers and pesticides; and how to access market information.

4.3. Program’s approach on agribusiness management skills

Differences in business management practices between graduates and non-graduates were few. Business registration was low (2 percent of sample), and record-keeping was generally weak (17 percent keeps records on inputs, costs, production, and sales) for both graduates and non-graduates. Only 7–8 percent of graduates and non-graduates had a business plan (Table 8). More respondents kept records of sales (45–51 percent of respondents) but not on inputs, costs, and production. About a quarter said they reviewed financial performance of the business and analyzed where there are areas for improvement.

Only a few practices differed between the two groups. About 5 percent of graduates and a higher percentage (16 percent) of the non-graduates kept financial records. Similarly, 6 percent of graduates and a higher proportion (15 percent) of non-graduates kept records of every purchase and sales. A greater proportion of non-graduates also reported having a quality control system for produce/products (21 percent) compared to only 8 percent of graduates. Compared to 23 percent of non-graduates, a greater proportion of graduates reported having records to document business operations to the bank (40 percent). Overall, the level of record-keeping was weak for both graduate and non-graduates. There was no indication that graduates have better record-keeping than non-graduates.

Although there were no dramatic differences between graduates and non-graduates, other stakeholders supported the need for the ATVET4Women. An instructor at one of Malawi’s agricultural campuses, for example, generally supported the expansion of programming in agricultural, technical, and vocational education. Another government official was passionate that the ATVET4Women program needs greater visibility in rural areas. Better “marketing” of the program is an important consideration to expand the program successfully. Both of these respondents, as well as a third government official, stressed the need to increase women’s opportunities to attend agricultural entrepreneurship trainings and to have programs that show women opportunities in a range of agricultural career tracks.

Table 8. Percentage of women graduates and non-graduates by business management practices

Indicators	Graduate (B&L) ^{/a}	Non-graduate (B&L) ^{/a}	
Farm/firm registered	0.02	0.02	
Keep records on inputs, costs, production, and sales	0.17	0.17	
Have a business plan	0.08	0.07	
Have a quality control system for produce/products	0.08	0.21	**
Have a food/product safety or sanitation management plan	0.26	0.27	
Keep financial records	0.05	0.16	**
Keep records of every purchase and sales	0.06	0.15	*
Use records to know whether sales of a particular product are increasing or decreasing from one month to another	0.45	0.51	
Regularly use \records to know whether sales of a particular product are increasing or decreasing from one month to another	0.45	0.49	
Worked out a cost of each main product sold	0.32	0.29	
Know which goods make the most profit per item in selling	0.75	0.69	
Have a written budget, which tells how much the farm/firm has to pay each month for rent, electricity, equipment maintenance, transport, advertising, and other indirect costs of the business	0.09	0.13	
Have records to document business operation to the bank	0.40	0.23	
Review the financial performance of the business and analyze where there are areas for improvement	0.26	0.29	
Number of women respondents	65	217	

Source: IFPRI/Wadonda household survey (2019). Note: ^{/a} For comparability, we restricted the non-graduates to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe); Statistically different at * 10%, ** 5%, and *** 1 % level of significance.

4.4. Program outcomes

This section focuses on vegetable VCs, in which the non-formal training component of the program has started. Vegetables have high market potential and contribute significantly to household income and nutrition. From past reports, vegetables contribute about 35 percent of household income in Malawi (Chagomoka, Afari-Sefa and Pitoro 2014). Among beneficiary households, the vegetable VC contributed to at least three-quarters of income of 46 percent of households (Table 9). Among non-beneficiary households, the vegetable VC contributed at least three-quarters of income of 30 percent of households and contributed about a quarter to a half of household income of 50 percent of households. These findings show the importance of vegetable VCs in the livelihoods of the sample households. This VC is constrained, however, by the availability of high-yielding seeds, spoilage, lack of funds for upgrading to high-value vegetables, and lack of reliable markets.

There is no clear pattern of difference between beneficiary and non-beneficiary households. We see that 22 percent of beneficiary households were not growing vegetables and 5 percent of them were growing some vegetables but were not selling; whereas 10 percent of non-beneficiary households were not growing vegetables. Of those growing, beneficiary households had generally greater income from vegetables than non-beneficiary households. Both beneficiary and non-beneficiary households have similar land area planted with vegetables (0.5 acre on average), although beneficiary households cultivated more land area and the proportion planted with vegetables was smaller. Most beneficiary and nonbeneficiary households heavily rely on crop farming as their main source of income, although more nonbeneficiary households rely on farm and nonfarm wage employment as their main livelihood than beneficiary households.

Table 9. Importance of vegetable VC in household income (% of sample households)

	All (all 5 districts) ^a	Beneficiary (B&L) ^b	Non-beneficiary (B&L) ^b	Difference	
Number of observations	545	111	171		
<i>Proportion of income from vegetable VC</i>					
Have not started	37.1	22.1	10.3	11.8	**
Almost none or minimal	3.3	4.8	0.0	4.8	**
About a quarter	22.6	19.2	35.1	-15.8	**
About half	11.4	7.7	24.7	-17.0	***
About three-quarters	22.1	36.5	27.8	8.7	
Almost all or all	3.5	9.6	2.1	7.6	**
Land area planted with vegetable (acre)	0.3 (0.3)	0.5 (0.5)	0.4 (0.3)	0.1	
% of land area planted with vegetable	27.9 (38.0)	32.2 (32.0)	45.8 (39.0)	-13.7	***
<i>Most important source of income</i>					
Crop farming	73.0	82.9	65.5	17.4	***
Agricultural wage labor	11.0	4.5	15.8	-11.3	***
Trader	8.6	9.0	9.9	-0.9	
Others	7.3	3.6	8.8	-5.2	*

Source: IFPRI/Wadonda household survey (2019). Notes: Figures are percentages of total sample, unless indicated otherwise. For continuous variables, values shown are the means, and values in parentheses are standard deviations. Statistically different at * 10%, ** 5%, and *** 1 % level of significance. ^a Includes all 5 districts where the survey was conducted. ^b For comparability, we restricted the non-beneficiaries to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe).

High-value vegetable production is still limited in the study area. Almost all households grew some leafy vegetables, mainly for home consumption. Other than leafy vegetables, tomato was the most commonly produced vegetable (grown by 94 percent of higher-value vegetable growers or 40 percent of all sample households). The second most common was onion (grown by 23 percent of higher-value vegetable growers or 11 percent of all sample households). Only 15 percent of the sample households had some farm machinery, and none had greenhouses. Only 1 percent had any water system, such as the use of pumps or formal irrigation systems, while the overwhelming majority use water cans or buckets to source water from a nearby river.

A total of 81 percent of households hired labor to complement their family labor, and the rest (19 percent) relied only on family labor. Of those hiring, the majority of them hired one to three laborers.

In general, households reported minimal use of external inputs, and costs of production were generally low. A total of 32 percent of households used inorganic fertilizer; among fertilizer users, the average fertilizer cost was MWK52,000 (USD71). A total of 38 percent used agrochemicals; among these, the average agrochemical cost was MWK22,000 (USD31). Half of tomato and onion growers bought seeds; among them, the average seed cost was MWK9,300 per acre (USD13).

Table 10 shows the VC outcome indicators of beneficiary and non-beneficiary households, particularly production, sales, costs, and profits. In almost all of the indicators, there is no statistically significant difference between graduates and non-graduates. Average production per year was 577 kg valued at MWK317,467 (USD434). Average yield is 1,432 kg per acre, which is much lower than the attainable optimal yields of 6,000–8,000 kg per acre. Almost all households (97 percent) sold their produce, selling 77 percent of their produce on average and consuming the rest. Profits were MWK238,000 per year on average, which is USD380 per year or just over USD1 per day. Considering that vegetable production

accounts for at least half of household income for the majority of sample households, these incomes are low and inadequate for a household with an average size of five to six members. Beneficiary households had slightly higher production and sales and higher productions costs than non-beneficiary households, but none these values is statistically different.

Table 10. Comparison of VC outcome indicators between beneficiary and non-beneficiary households

	All (5 districts) ^{/a}	Beneficiary (B&L only) ^b	Non- beneficiary (B&L) ^b	Difference
Number of observations ^{/c}	167	57	56	
Total per year				
Production (kg/year)	577.21 (713.16)	667.60 (690.78)	529.50 531.47	138.10
Value of production (MWK/year)	317,466.80 (392,239.20)	367,179.00 (379,927.30)	291,223.00 (292,308.30)	75,956.00
% sold	77.79 (22.43)	77.53 (19.52)	79.89 (20.99)	-2.36
Sales revenue (MWK)	267,500.70 (365,605.40)	300,466.50 (322,302.70)	243,908.00 (266,993.00)	56,558.50
Variable costs (excl. labor) ^{/d}	26,428.04 (57,006.89)	33,481.81 (32,113.28)	18,536.19 (27,132.49)	14,945.62
Hired labor costs	6,906.65 (19,014.17)	8,090.91 (18,726.61)	10,432.69 (26,189.69)	-2341.78
Total variable costs	33,334.68 (22,854.97)	41,572.72 (46,430.24)	28,968.88 (48,101.84)	12,603.84
Profits ^{/e}	238,060.70 (355,001.20)	262,626.80 (294,289.80)	234,585.90 (234,585.90)	28,040.90
Per acre				
Yield (kg/acre)	1,432.54 (1,420.09)	1,537.04 (1,447.63)	1,350.48 (1,408.02)	186.56
Value of production per acre (MWK/acre)	784,879.70 (788,544.30)	841,357.80 (794,621.30)	736,079.60 (787,420.90)	105,278.20
Sales revenue (MWK/acre)	655,424.40 (699,196.80)	696,855.00 (692,083.90)	608,966.80 (671,850.50)	87,888.20
Variable costs (excl. labor) per acre ^{/d}	70,392.83 (150,821.10)	79,427.54 (67,055.32)	47,238.15 (56,974.26)	32,189.39
Hired labor costs per acre	13,650.78 (36,873.40)	14,002.84 (18,726.61)	21,041.67 (19,226.77)	-7,038.83
Total variable costs per acre	84,043.60 (164,294.30)	88,395.06 (81,684.89)	68,279.82 (96,858.57)	20,115.24
Profits (returns to family labor) per acre ^{/e}	585,103.60 (671,804.00)	619,400.10 (651,412.80)	528,062.80 (625,614.40)	91,337.30
Costs per unit of output (MWK/kg)	66.87 (100.27)	82.36 (106.09)	56.04 (74.46)	26.32

Source: IFPRI/Wadonda household survey (2019).

Note: MWK=Malawi kwacha, exchange rate was MWK732 to USD1 (March 6, 2020). Values shown are the means, and values in parentheses are standard deviations. Statistically different at * 10%, ** 5%, and *** 1 % level of significance.

^{/a} Includes all 5 districts where the survey was conducted. ^{/b} For comparability, we restricted the non-beneficiaries to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe). ^{/c} Number of observations is much lower

than the total sample, and include those engaged in vegetable production, particularly tomato and onion. Almost all households have some leafy vegetable production, mainly for home consumption. Issues of weights and conversions did not allow the research team to have meaningful estimated of production value and profits from leafy vegetable production. For comparability, we selected the household engaged in tomato and/or onion production (98 percent of the households with vegetable production other than leafy vegetables). There are 242 tomato or onion growers: some had just started production and had not harvested yet by the time of the survey; some did not harvest anything due to floods or other reasons; and a few others did not provide production data or provided data that are not realistic (extremely high or low values), so we dropped a few of these cases in the analysis. The total number of households included in the analysis of VC outcomes is 167 in all districts. ^{/d} Costs included seeds, fertilizer, agrochemical, fuel, electricity, transportation, and hired labor. ^{/e} Profits are calculated based on sales revenue minus variable costs and can be interpreted as returns to family labor.

Using the survey data, we look at changes in various VC outcome indicators from 2018 to 2019 (time of survey) based on respondents' recall. About a third of beneficiary and non-beneficiary households reported an increase in production and sales; however, 50 to 58 percent of beneficiary and non-beneficiary households reported a decrease (Table 11). This pattern may be due to flooding from a nearby river that was reported during the qualitative interviews and that has affected both beneficiary and non-beneficiary households in the study area. The respondents also mentioned crop diseases and pests affecting vegetable production of both beneficiary and non-beneficiary households in the study area. Sixteen percent of graduates reported receiving higher prices for produce, but 60 percent said prices of produce decreased. A total of 28 percent of graduates changed agricultural practices and 10 percent changed marketing practices. There is no significant difference between beneficiary and non-beneficiary households in changes for almost all indicators. The exceptions are as follows: more beneficiary than non-beneficiary households hired more labor and decreased their plot sizes, and fewer beneficiary than non-beneficiary households changed marketing practices. The decrease in plot sizes seems to contradict the qualitative study, in which most interviewees spoke about increasing their vegetable plots. While these reported changes need to be further investigated, the lack of significant difference between graduates and non-graduates may suggest no clear contribution of the training to improvements in the VC outcomes and resilience in the study area.

Table 11. Percentage of households by reported changes in VC outcome indicators

	All ^{/a}	Beneficiary ^{/b}	Non-beneficiary ^{/b}	
Number of observations	242	99	143	
Change in quantity produced				
Increased	34	31	36	
Decreased	53	57	50	
No Change	4	3	4	
Change in quantity sold				
Increased	27	28	27	
Decreased	56	55	58	
No Change	4	3	4	
Change in prices received				
Increased	17	16	17	
Decreased	60	60	60	
No change	6	2	8	**
Change in market/buyers				
Change	28	19	34	**
No change	54	57	52	
Change in marketing practice				
Change	17	10	21	**
No change	65	65	65	

	All ^{/a}	Beneficiary ^{/b}	Non-beneficiary ^{/b}
Number of observations	242	99	143
Change in plot size			
Increased	34	35	33
Decreased	32	41	26 *
No change	30	23	34 *
Change in agricultural practices			
Change	25	28	23
No change	70	71	69
Change in variety/species			
Change	31	31	31
No change	64	68	62
Change in input quantity			
Increased	29	27	30
Decreased	56	65	50
No change	9	7	11
Change in cost of production			
Increased	47	55	43
Decreased	41	41	40
No change	6	3	8
Changes in family labor			
Increased	15	13	17
Decreased	29	25	31
No change	48	59	41
Changes in hired labor			
Increased	9	15	5 **
Decreased	17	15	18
No change	30	28	31

Source: IFPRI/Wadonda household survey (2019). Notes: Values are percentages of total sample; Statistically different at * 10%, ** 5%, and *** 1 % level of significance. ^{/a} Includes all 5 districts where the survey was conducted. ^{/b} For comparability, we restricted the non-beneficiaries to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe).

4.4.1 Benefits of training

These results are consistent with the qualitative study. Some graduates have changed their practices and accessed markets for their vegetables. After undertaking the training, women in the qualitative study discussed implementing lessons around agricultural production. The changes in agricultural production stemming from ATVET4Women include growing new crops (e.g., tomatoes, maize, soybean), farming crops more effectively, marketing goods to Thanthwe Farm (in the case of Lilongwe-based participants), using pesticides, and using irrigation methods. As two women stated,

We are focusing on vegetables, tomato and maize production.... With the readily available markets from the organization, I want to make sure that this helps me to improve my living standards.
(woman, Lilongwe)

We are doing modern farming practices like burning the waste right in the garden, proper irrigation. I can say we are taking care of the crops better than we were before. (woman, Blantyre)

Only one woman attributed changes in her household dynamic to ATVET4Women. Alluding to the gender component of the curricula and the importance of working together with one's spouse, she explained,

There is something that we have learnt about farming. I know that in the near future, things will really change for the better.... We have learnt how to grow vegetables and tomatoes but also how to have a good discipline at home for development to follow.... You know that for a husband to have his own budget and a wife another separate budget; you cannot achieve anything because it means that right away the family has no focus. So, this is why I talk about having discipline. (woman graduate, Lilongwe)

Husbands of graduates also mentioned that the skills they had gained helped to increase household incomes. For example, one respondent said that, as a result of the income earned from growing vegetables,

I managed to open a tearoom for the family using the income I generated from irrigated garden. This tearoom has come from the garden. We learnt that whenever we find some money like profits, we should not just leave it but we need to invest it into something that should also generate some money. Using the money, we generated from the irrigated vegetables; I was [also] able to buy some food for the household. (man, Lilongwe)

Another said that his family's production had previously been inconsistent but that the training helped them move from a less to a more stable footing: "She learned some things from the trainings. At first the family was shaky because certain things weren't going on well. Since she came from the trainings, we are very stable and different from the way we used to stay in the past."

Most of the husbands also commented that the trainings had helped them understand how to work together in a team within the household. One explained: "They said it is important because we should not segregate the work that a man or a woman can do. Whatever a man can do a woman can also do."

4.4.2 Challenges to implementation of training lessons

Despite women graduates' ability to implement some of the lessons learned, there were challenges to adopting the lessons from the training. These challenges largely emphasize lack of financial resources in a variety of ways. Most women explained that to practice more of the lessons learned they would need to purchase inputs (e.g., seeds, watering cans, fertilizer, pesticides, etc.). One woman lists several of the inputs she would need, and also invokes fatigue as a reason why she has not successfully implemented the messages.

We have inadequate money to be able to buy the seeds for our gardens, this is a great challenge. Secondly, we did not have money to buy pesticides and this is a big challenge as well. Thirdly, we do not have land and we pay rentals each time we want to cultivate our garden.... We need farming implements like hoes, and we also need pipes for our irrigation equipment because the ones that we have a lot of holes in it. They need special care. After irrigation, we need to dry the pipes and then fold them. I think we haven't done these procedures well and this is why our pipes have developed holes. Sometimes we are too tired to remember all those procedures.. (woman, Lilongwe)

Another woman, also from Lilongwe, describes how her family grew tomatoes (part of the ATVET4Women curricula) but did not earn enough from the sales to purchase inputs for additional agricultural activities taught in ATVET4Women.

I haven't yet started using the new skills. We did not make enough money from the tomato sales to enable us buy to inputs for our garden. We could have used the tomato sales to buy fertilizers that we were trained to use. We only followed pesticide application procedures that we learnt from them. (woman, Lilongwe)

Similarly, several husbands noted that they could not apply all that they learned without additional resources. One said that additional services would help them to apply the knowledge and skills that they learned, mentioning inputs such as

fertilizers, loans and extension services. ... I need extension services to be able to grow these crops well. The extension workers should periodically visit us in order to make sure they guide us with extension services. (man, Blantyre)

Others highlighted the need for better transport and coordination to minimize the losses in bringing the vegetables to the market. Two women said,

For instance, the business lessons—I am failing to implement them because of lack of transport to the market. We don't have a bicycle and so it is difficult to do business. (woman, Lilongwe)

After the training, we managed to go to the farm and we produced the first crop and Thanthwe bought it. They bought the tomatoes at a lesser price than expected. In addition, Thanthwe just took 5 kg of tomatoes from each farmer and they left the rest of our tomatoes. Our remaining tomatoes got damaged because we lacked market.... They did not explain why they did this to us. We made losses from these transactions. (woman, Lilongwe)

A woman from Blantyre alluded to distrust in her community village savings and loan association (VSLA) and how that reduces her access to funds for agricultural inputs. In her words,

The challenge is that we lack the inputs. We still have the village loans and savings group where we are practicing this as a group, but everyone is afraid the group may end so there is no hard work. (woman, Blantyre)

One woman entrepreneur who has been quite successful in her businesses—she has three—applies often for loans. She reported,

It has been difficult. I pitch my business ideas for money. Like today I went to [a major donor] to pitch my ideas; we will hear the results tomorrow. If successful, we will be given money for equipment... US \$40,000. It has not been easy, but I am a go-getter and I make sure I find a way. In the past, I have received a grant before from the Ministry of Trade, which I used to buy the equipment that I have. I always look for such opportunities to grow my business. When I do not have any cash, any capital I look for grants. I have been lucky because I was able to get a few. But it is not easy. I cannot even get a loan. (woman, Lilongwe)

Together, these examples show how women may plan ahead for their agricultural businesses but are not always able to enact strategic decisions because their financial resources are often too precarious. Enhanced communication between producers and marketers and enhanced trust in communities could make women's financial resources more predictable, thereby allowing women to adjust their business plans accordingly.

The natural environment also poses challenges. For instance, drought and flooding both arose as a challenge women farmers faced in implementing the ATVET4Women programming. A woman from

Blantyre discussed the ramifications of drought:

There is also a general shortage of water in this village, the river we rely on gets dry in the dry season.... It would be helpful to have water tanks. Most of the problems that we are facing is because of shortage of water. When we went there that is when they told us that we are going to learn about vegetable production, we just accepted it because we could not have just come back. (woman, Blantyre)

A recent flood in the Lilongwe was an unforeseen challenge for at least three women, as the flood ruined their tomato crops. As one woman said,

We had a destructive rain that damaged our tomato crop and most of it wilted as a result of water logging conditions. We experienced heavy losses and we did not manage to buy the inputs as required... we did not profit from these trainings. Our crop experienced a disaster and we were unable to sell them. Our colleagues who grew their crops above the wetland zone where they did not experience floods are currently selling their crop. (woman, Lilongwe)

Future agricultural training programs may want to consider addressing environmental challenges and offer training on climate smart agricultural practices.

Despite women graduates' visions for their farming activities and agribusinesses, limited resources constrain them from upgrading their position in the value chain. Women graduates named a wide range of different resources needed to enact their preferred strategic choices: capital, seeds, fertilizer, pesticides, hoes, watering cans or treadle pumps, labor, bicycles, and even electricity. As three women graduates shared,

I want to try and grow an acre of vegetables but this needs a lot of money. This is where I am stuck and I don't see this happening soon. I don't have the capacity, and this is why I'm reluctant. I don't want people to laugh at me and say, "she expanded the garden but she has no seed to grow on it!" This is why I have accepted that we can't do it and we have to be contented with the current situation as of now. (woman graduate, Lilongwe)

Some activities in processing require that you have electricity. For instance, we need a refrigerator to make sure that you preserve some perishable crops. In addition, we also need money to support our activities.... We need a lot of things but I'm not sure what exactly we may need to process each farm produce. (woman graduate, Lilongwe)

With the problem of water, we use a watering can, and this is very tiring. If I had a treadle pump it would help me expand and change my work in the value chain. (woman graduate, Blantyre)

While different women need different resources to enact their preferred strategic choices, most women had similar ideas how to acquire the resources needed. Many women believed that different organizations in the community could provide them access to the resources they need.

I can still request the inputs for the same enterprises I want to venture into like maize, soy and beans.... I can request for resources and training as well so that they teach me how to go about it.... I don't know where else to get these apart from Thanthwe Farm. (woman graduate, Lilongwe)

Additionally, a few women graduates thought community organizations would be an avenue to access credit to use toward purchasing the resources needed. As one woman graduate stated,

We can buy them [resources] from farmer's world [local agricultural inputs shop] but if it is to do with money then organizations can assist us with loans. Sometimes we access money from care groups (VSL) sometimes we take loans from there to support our farming like buying fertilizers. (woman graduate, Lilongwe)

Similarly, one woman noted that Thanthwe Farm offers loans to purchase resources. The Thanthwe Farm outgrower model may be replicated elsewhere to bolster women's access to resources.

For Thanthwe Farm, because sometimes they offer these resources at a loan which is paid gradually as you sell your produce through them. (woman graduate, Lilongwe)

Not all women, however, and particularly those from Blantyre, were as certain about how to access resources needed to upgrade their work in agricultural value chains. As one woman graduate explained, the options available to her are not sufficient. In her words,

I don't know where I would get it. In our village bank I can only get a very small amount that cannot be enough to buy a treadle pump. (woman graduate, Blantyre)

5. EMPOWERMENT

5.1. Women’s Empowerment Index in Agriculture (Pro-WEAI)

This section describes the main results on women’s and men’s empowerment. Based on 11 pro-WEAI indicators and a threshold for being empowered in 8 out of the 11 indicators, 73 percent of women and 85 percent of men in the sample are empowered (Table 12). The 3DE score was 0.89 for women and 0.94 for men, indicating that women are more likely to experience a higher proportion and depth of disempowerment compared to men. Another component of the pro-WEAI is the GPI, which reflects women’s achievements relative to men in the same household. The GPI score is 0.94; and 73 percent of all DHHs achieved gender parity (similar level of empowerment between a man and woman within the household). The average empowerment gap, or the average percentage difference in empowerment between men and women in households that did not achieve gender parity, was 0.20. Both the 3DE score and the GPI score are used to calculate the pro-WEAI score, which is 0.89 for this sample.

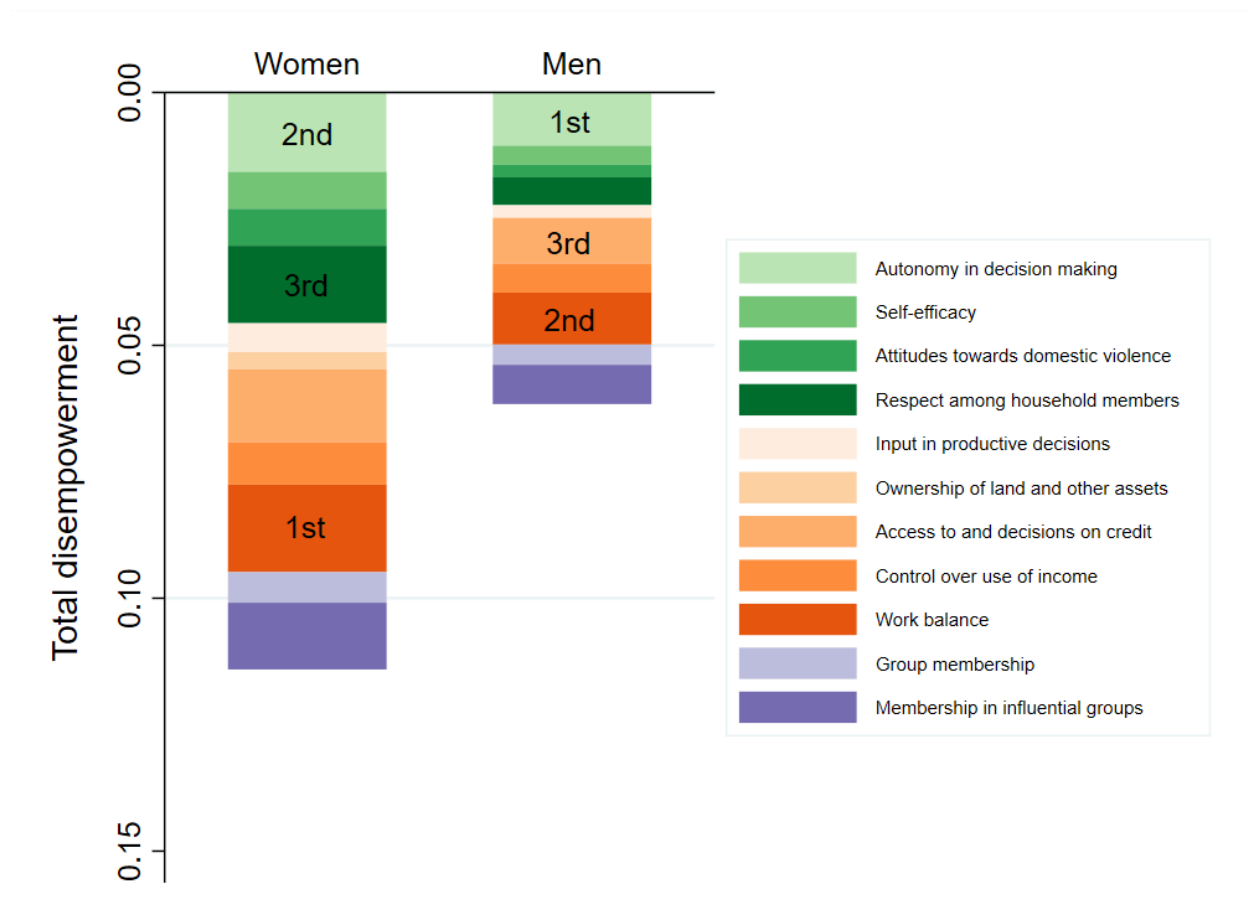
Table 12. Pro-WEAI results

Indicator	Women	Men
Number of observations	510	363
3DE score	0.89	0.94
Disempowerment score (1 – 3DE)	0.11	0.06
% achieving empowerment	73	85
% not achieving empowerment	27	15
Mean 3DE score for not yet empowered	0.58	0.58
Mean disempowerment score (1 – 3DE)	0.42	0.42
Gender Parity Index (GPI)	0.94	
Number of dual-adult households	363	
% achieving gender parity	73	
% not achieving gender parity	27	
Average empowerment gap	0.20	
Pro-WEAI score	0.89	

Source: IFPRI/Wadonda survey 2019.

Figure 4 presents the top contributors to disempowerment, by sex. The top contributors to disempowerment for women included lack of work balance (15 percent), lack of autonomy in decision-making (14 percent), and lack of respect among household members (13 percent). The top contributors of disempowerment among men were lack of autonomy in decision making (17 percent), work balance (17 percent), and access to and decisions on credit (15 percent).

Figure 4. Contributions to disempowerment



Source: IFPRI/Wadonda survey 2019.

The main source of inadequacies and disempowerment by type of agency and by indicators among women and men are listed in Table 13. Among the intrinsic agency indicators, approximately half of all women and men lacked autonomy in income, with men faring worse than women, especially among beneficiaries. More women and men used income as others expected of them, and fewer women and men used income as they themselves personally wanted (Annex Figure 1). These patterns of reported income use may be related to low income and the inability to satisfy basic needs and wants, which is reflected as a lack of autonomy in income. For example, among sample households that depend on crop farming for the main livelihoods, vegetable production provides MWK238,000 of income per year on average, which is USD380 per year, or just over USD1 per day (see discussion of incomes from the vegetable VC in section 4.3).

Among other intrinsic agency indicators, self-efficacy, or one's belief in one's own ability to succeed or accomplish tasks, was high for both women and men regardless of beneficiary status. Most women and men achieved adequacy in respect among household members, indicating generally harmonious intrahousehold relationships (i.e., mutual respect and less conflict between husband and wife or between the two household decision-makers). Non-beneficiary men were more likely to achieve adequacy in this indicator compared to non-beneficiary women, suggesting that there is room to improve intrahousehold relationships in non-beneficiary households. Although most women and men also achieved high adequacy in rejecting the acceptability of IPV against women, women were more tolerant and accepting of domestic violence than men. Women were more likely to report that a husband beating his wife was justified in all

six scenarios we narrated (Annex Figure 2).

Among the instrumental agency indicators, most women and men (more than 86 percent) achieved adequacy in input in productive decisions and ownership of land and other assets. This finding is consistent with earlier WEAI applications (USAID Feed the Future FEEDBACK 2013, 2015; Ragasa et al. 2020). Despite the high adequacies in these indicators, women, especially in non-beneficiary households, still lagged behind men.

Approximately half (52 percent) of women and men achieved adequacy in access to and decisions on financial services. This figure is much higher than earlier WEAI findings in Malawi, in which roughly a third achieved adequacy in this indicator (USAID Feed the Future FEEDBACK 2013, 2015; Ragasa et al. 2020). Approximately 70–72 percent of households had access to friends or relatives and group-based microfinance including VSLA/SACCOs: of those households, 40–66 percent of households actually borrowed (Annex Table 5). While 49–65 percent of households have access to credit from NGO or formal lenders, only 3 percent of men and 5 percent of women reported that their households actually borrowed from formal lenders and only 14 percent of women and men reported that their households borrowed from an NGO. Beneficiary women and men were less likely to achieve adequacy in access to and decisions on financial services compared to their non-beneficiary counterparts.

While beneficiary women had higher adequacy than beneficiary men in control over use of income, non-beneficiary men had higher adequacy in this indicator compared to non-beneficiary women. Both women and men fared poorly on work balance—less than 55 percent of respondents achieved adequacy in this indicator; it was also one of the biggest contributors to disempowerment. Beneficiary women had the lowest adequacy in this indicator (35 percent). These patterns are generally consistent with earlier WEAI applications in the Malawi Feed the Future Zones of Influence surveys for women respondents, although the adequacy increased substantially from 43 percent during the baseline survey in 2013 to 77 percent during the midterm evaluation in 2015 (USAID Feed the Future FEEDBACK 2013, 2015).

Adequacy in indicators on collective agency were generally high and showed no gendered differences. Our results are consistent with earlier WEAI applications in the Malawi Feed the Future zones of influence for women respondents (USAID Feed the Future FEEDBACK 2013, 2015), although adequacy in this sample is much higher than in the nationally representative survey conducted by Ragasa et al. (2020), which showed roughly a third achieving adequacy in this indicator. High adequacy in group membership was largely due to membership in religious groups (73 percent of women and 68 percent of men) (Annex Table 8). Men were more likely to be a member of an agricultural producer group (66 percent of men and 59 percent of women were members) while women were more likely to be a member of credit or microfinance group (56 percent of women and 35 percent of men were members). In terms of membership in influential groups, beneficiary women and men were less likely to achieve adequacy compared to non-beneficiary women and men. Adequacy in membership in influential groups was driven by religious group participation for both women and men.

Table 13. Percentage of respondents by adequacy in pro-WEAI indicators

	All ^{/a}			Beneficiaries ^{/b}			Non-beneficiaries ^{/b}			Test between beneficiaries and non-beneficiaries	
	Women	Men	Gender gap	Women	Men	Gender gap	Women	Men	Gender gap	Women (B vs. NB)	Men (B vs. NB)
<i>Intrinsic agency</i>											
Autonomy in income	55	44	-11***	57	36	-21***	51	53	1	5	-17**
Self-efficacy	85	87	2	88	88	0	84	79	-5	4	10*
Attitudes about intimate partner violence against women	82	92	9***	87	88	0	80	96	16***	7	-8**
Respect among household members	63	86	23***	72	80	8	59	86	27***	13**	-6
<i>Instrumental agency</i>											
Input in productive decisions	92	96	4**	95	98	2	92	97	5	3	1
Ownership of land and other assets	93	100	7***	86	100	14***	95	100	5**	-10***	0
Access to and decisions on financial services	68	69	1	52	52	-1	62	63	1	-10	-12*
Control over use of income	88	89	1	89	77	-12**	88	96	8**	1	-19***
Work balance	42	56	14***	35	46	11	50	60	9	-15**	-14*
<i>Collective agency</i>											
Group membership	92	92	-1	89	92	2	91	90	-1	-2	1
Membership in influential groups	76	78	2	66	71	5	77	73	-4	-11**	-3

Source: IFPRI/Wadonda survey (2019); Note: B=beneficiaries; NB=non-beneficiaries. p<.10 ** p<.05; *** p<.001. Beneficiaries are defined as women and men in a household with at least 1 graduate. Specific details of these indicators can be found in Annex Tables 1, 3–9 and Annex Figures 1–2. ^{/a} Includes all 5 districts where the survey was conducted. ^{/b} For comparability, we restricted the non-beneficiaries to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe).

The qualitative study revealed that decision-making and work balance indicators are inextricably linked. This connection is particularly salient for members of producer households, where deciding what agricultural tasks to do and when to do them are the principal choices women and men must make, often in discussion with their spouses. Decision-making, and therefore work balance, is moderated by two factors: marital status and entrepreneurship and employment opportunities.

Unmarried women (e.g., never married, separated/divorced, or widowed) are perceived to have greater decision-making power and control over their time. As women graduates explained, unmarried women

have greater control because they do not have a husband they must consult. As two women graduates explain,

When they are not married, they can do anything without anyone objecting. When married it is difficult. Not all men can let their wife do business or be in a group. (woman graduate, Blantyre)

Before marriage women have more control over their time and when they decide something, they are able to implement, e.g., you can find your own garden and invest.... Being single can make someone have more control because they can make budgets and implement them. (woman graduate, Lilongwe)

After marriage, social norms dictate that good wives defer to their husbands. In fact, women who speak their minds freely may be perceived as rude and/or threatening to men's status as the head of the household. As one woman explained,

Whenever my husband brings a different decision on what I'm supposed to do, I take my husband's decisions and leave mine.... Because a husband's decision is like an order; you just have to take it.... I have never led my husband in decision making because he is regarded as the head of the household. . . . This is a family etiquette.... Men have more wisdom to support their households.... Women only decide when and what to cook.... They do not need to have control over their time. . . (woman graduate, Lilongwe)

Not all women share this perspective, however. One woman advocated for using community-level trainings to shift men's perspectives on women's role in marriage. As one woman said,

If there was a training targeting men to tell them how to live in a marriage. Things have changed and they need to change too, that women can also do other things than just taking care of her husband and children. (woman graduate, Blantyre)

Examples from other women, however, reveal that the social norms guiding women's submission to their husbands is more nuanced in practice. Some women graduates gave examples of how they exercise decision-making, and therefore exercise control over their time. One woman discussed how she and her husband sometimes strategize the best course of action before completing any task. In her words,

I make my decisions on my own depending on the space I have. There are some tasks that are already laid down each day for me to do. For instance, every morning we know that a husband and wife are supposed to go to the garden and work. When you come back, it is when you decide to go and wash or cook.... Sometimes my husband will tell me to do something and if I don't have time to do it; will push it to the next day. We usually discuss when I do or do not have the time.... For instance, around 3 or 4pm; I am usually free to decide what to do on my own.... I sometimes perform certain tasks that my husband assigns me. I am also able to make an excuse and do them later whenever I feel they come at inappropriate time. For instance, giving me a task when I am supposed to prepare food for the family will make me shift the activity to another time or even giving me a task when the child is sick. (woman graduate, Lilongwe)

A few other women graduates highlighted how they and their spouses work together or share information, and they welcome such collaboration as a means to use their time more efficiently. As two women graduates from Lilongwe shared,

I feel women have control over their time when their husbands are around. Like my husband was

able to help me in some activities like irrigation. (woman graduate, Lilongwe)

Men are also very helpful. For instance, I am taught different things by my husband and this helps me to do things efficiently. I think if I divorced my husband I would struggle to do things on my own. I may not have more control over my time that way. (woman graduate, Lilongwe)

Further, women from Lilongwe reflected positively on the gender-sensitization component of the ATVET program. Their comments suggest that norms around women's roles in livelihood and domestic roles are changing. For instance,

Regarding family activities, they explained that there is need for families to have a work schedule so that every activity runs smoothly [W]e have learnt how to grow vegetables and tomatoes but also how to have a good discipline at home for development to follow.... You know that for a husband to have his own budget and a wife another separate budget; you cannot achieve anything because it means that right away the family has no focus. So, this is why I talk about having discipline. (woman, Lilongwe)

They taught us that everyone has the capacity to develop whether male or female. We should not look down up ourselves because we are women. They added that making calculative decisions can prosper an individual and that we should not always be dependent on our husbands. (woman, Lilongwe)

Women graduates had mixed opinions on whether entrepreneurship and employment opportunities would increase their decision-making power and work balance. Those who felt it would grant women more control over their time thought so because of the anticipated additional income. As a few women said,

I would be making money and be able to do things on my own. (woman, Blantyre)

If you have a new job; you have extra money to be able to give some tasks to others. (woman, Lilongwe)

I would have more money then and so I would have more control over my time. Whatever I want to do will be possible because I have money. (woman, Blantyre)

Women graduates who did not believe entrepreneurship and employment opportunities would give women more control over their time were vague about their reasoning. One woman reasoned that she would have less control because she would be unable to leave her workplace. In her own words,

If you are working, you are tied to your work because you are paid. This may not give you control over your time. (woman graduate, Lilongwe)

Another woman graduate did not believe an employment opportunity would grant her more control over her time, because it would threaten intrahousehold harmony:

Most men do not want to be ruled.... This [having a job] can't make me have more control because it would seem like you have used the job as an opportunity to have more control. So, this may not work. (woman graduate, Lilongwe)

Her reasoning reveals that acquiescing to her husband's control to maintain intrahousehold harmony and affirm relationships may be a more tolerable choice than deciding to take on independent work or set an

independent schedule.

One woman entrepreneur apparently made the decision to divorce her husband in part over her desire to have more autonomy in her business. She explains:

After my divorce, it was like the world changed for me, and I developed into this woman you are seeing today. I was not supposed to say anything when we were in a group, because when I speak my husband would give me signs to stop talking. Now, I can do whatever I want to do. (woman, Lilongwe)

From the survey data, we ran a series of pair-wise correlation analysis to assess any statistical association between the VC outcomes and women’s empowerment indicators. We did not find any correlation in most of the pairs, except some weak positive correlation at 10 percent level of significance between vegetable productivity and production and women’s empowerment score and membership in influential groups (Annex Table 10). No correlation was observed between revenue and empowerment indicators. These results are only indicative of the relationship between VC outcomes and women’s empowerment at this point. Further analysis, with longer time period, would be needed to rigorously establish this relationship.

5.2. Additional indicators for women’s empowerment in value chains

We also looked at two candidate indicators that are not included in the original pro-WEAI but may be important for VCs: entrepreneurship mindset and access to information. We asked respondents whether they agree, neither agree or disagree, or disagree with 11 statements that indicate entrepreneurship mindset (adopted from Frese and Gielnik 2014). Entrepreneurship mindset was high in the sample—more than 80 percent of respondents achieved adequacy (Table 14), although there were slight differences by gender. Access to information was measured by whether respondents received information on agriculture and markets from any sources, including extension agents, radio messaging, ATCs, friends, and neighbors, among others. Access to information was lower for women than men for both beneficiaries and non-beneficiaries.

Table 14. Percentage of respondents by other value chain indicators

	All ^{/a}			Beneficiaries ^{/b}			Non-beneficiaries ^{/b}			Test between beneficiaries and non-beneficiaries	
	Women	Men	Gender gap	Women	Men	Gender gap	Women	Men	Gender gap	Women (B vs. NB)	Men (B vs. NB)
Entrepreneurial mindset ^{/a}	89	93	4*	89	94	4	88	88	1	1	5
Access to information											
Acquired information on any productive activity	49	69	21***	44	61	17**	40	64	24***	4	-3
Acquired information on any activity	49	70	20***	45	62	17**	41	63	22***	5	-1

Source: IFPRI/Wadonda survey (2019); Note: B=beneficiaries; NB=non-beneficiaries. p<.10 ** p<.05; *** p<.001. ^{/a} More details can be found in Annex Table 9. ^{/a} Includes all 5 districts where the survey was conducted. ^{/b} For comparability, we restricted the non-beneficiaries to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe).

5.3. Local environment influencing women’s participation and empowerment

This section describes the local environment that potentially affects women’s participation and empowerment in the VC, focusing on access to reliable sanitation, menstrual hygiene management (for women only), sex and fertility agency, and sexual hostility in the working environment.

5.3.1 Access to reliable sanitation

Only one-half and one-third of all respondents reported that they had access to a clean and safe place to urinate or defecate, respectively (Table 15), at the place where they normally work (the farm). Access to urination and defecation facilities was slightly higher for men than for women. Beneficiaries were less likely than non-beneficiaries to report having access to defecation facilities. Between 50 percent and 75 percent of the sample reported having access to a handwashing facility at their normal place of work. These findings have implications not only for women’s (and men’s) comfort and welfare but also for food safety and hygiene. Vegetable products are sometimes consumed raw, and food contamination due to poor sanitation can pose significant food safety and public health risks.

Table 15. Percentage of respondents by access to reliable sanitation

	All ^{/a}			Beneficiaries ^{/b}			Non-beneficiaries ^{/b}			Test between beneficiaries and non-beneficiaries	
	Women	Men	Gender gap	Women	Men	Gender gap	Women	Men	Gender gap	Women (B vs. NB)	Men (B vs. NB)
Has access to.... at their normal place of work											
urination facility	49	52	3	33	53	19***	37	57	20***	-4	-5
defecation facility	32	37	5	21	25	5	22	41	19***	-1	-16**
hand washing facility	51	64	12***	50	74	23***	54	67	13**	-3	7
All three of the above	26	31	5*	15	22	7	20	32	12**	-5	-10

Source: IFPRI/Wadonda survey (2019); Note: B=beneficiaries; NB=non-beneficiaries. p<.10 ** p<.05; *** p<.001. ^{/a} Includes all 5 districts where the survey was conducted. ^{/b} For comparability, we restricted the non-beneficiaries to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe).

5.3.2 Menstrual hygiene management

More than 60 percent of women reported that they had menstruated in the past six months (Table 16). Among those who had menstruated in the past six months, only 25 percent of beneficiary women and 43 percent of non-beneficiary women reported that they had an acceptable place to change their cloth or pad at their place of work. Even fewer women (15 percent of beneficiaries and 30 percent of non-beneficiaries) reported having a place to dispose of their cloth or pad at work. Most women reported that they could acquire a pad when needed, and very few (less than 20 percent) reported using reusable cloths for menstruation. Approximately 82 percent of beneficiary women and 76 percent of non-beneficiary women reported that they experience some pain while menstruating. When asked about pain management, the majority of women reported either taking medicine or doing nothing to manage their pain. One-third of women reported ever missing work while menstruating because of inadequate facilities, and approximately 13 percent of women reported missing school or a social activity during their last menstrual period.

Table 16. Percentage of women respondents by menstrual hygiene management (women only)

	Beneficiaries /a	Non- Beneficiaries /a	Test of difference between beneficiaries and non-beneficiaries (B vs. NB)
Menstruated in past 6 months	65	52	13**
<i>Among those who menstruated in the past 6 months</i>			
Had an acceptable place to change cloth/pad at work	25	25	0
Had a place to dispose cloth/pad at work	15	14	1
Can acquire pad (as opposed to a reusable cloth)	92	75	17**
Uses reusable cloths	6	18	-12***
Experiences pain while menstruating	82	79	3
<i>Among those who experience pain</i>			
Manages pain with medicine	61	50	11
Manages pain with hot water bottle	0	3	-3
Manages pain by working less	0	0	0
Does nothing to manage pain	39	46	-7
Other pain management	0	3	-3
<i>Missing work and social activities</i>			
Never missed work because of inadequate facilities	67	76	-10
Missed work 1-2 times because of inadequate facilities	15	17	-2
Missed work 3-5 times because of inadequate facilities	18	3	15***
Missed work >5 times because of inadequate facilities	0	3	-3
Missed school or a social activity during last menstrual period	13	9	4

Source: IFPRI/Wadonda survey (2019); Note: Sample size ranges from 52 to 111 for beneficiary women and 200 to 431 for non-beneficiary women. /a For comparability, we restricted the non-beneficiaries to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe).

5.3.3 Sex and fertility agency

To measure marriage and fertility agency, respondents were asked about decision-making with regard to five questions: (1) the number of children to have, (2) whether to have another child, (3) whether to use contraceptives, (4) what type of contraceptive to use, and (5) when to have sex. Screening questions were used to skip questions when the statements were not applicable (e.g., post-menopausal, amenorrhea, etc.). Among non-beneficiaries, men were more likely to have adequate agency compared to women for the statements on number of children to have, whether to have another child, and when to have sex (Table 17). Regardless of beneficiary status, women were more likely than men to have adequate agency in the statements regarding contraceptive use and type.

Table 17. Percentage of respondents by sex and fertility agency (% of respondents)

	All ^{/a}			Beneficiaries ^{/b}			Non-beneficiaries ^{/b}			Test between beneficiaries and non-beneficiaries	
	Women	Men	Gender gap	Women	Men	Gender gap	Women	Men	Gender gap	Women (B vs. NB)	Men (B vs. NB)
Decides on:											
number of children to have	68	88	21***	73	83	10	57	89	32***	16**	-6
whether to have another child	66	88	22***	73	80	8	52	88	36***	21***	-8
whether to use contraceptives	86	69	-17***	86	70	-16**	75	67	-8	11	3
what type of contraceptive to use	83	58	-26***	82	60	-22**	71	50	-21**	11	10
when to have sex	45	97	52***	49	92	43***	42	100	58***	7	-8**

Source: IFPRI/Wadonda survey (2019); Note: B=beneficiaries; NB=non-beneficiaries. p<.10 ** p<.05; *** p<.001. Sample size ranges from 50 to 97 for beneficiary women, 41 to 61 for beneficiary men, 155 to 333 for non-beneficiary women, and 189 to 242 for non-beneficiary men. ^{/a} Includes all 5 districts where the survey was conducted. ^{/b} For comparability, we restricted the non-beneficiaries to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe).

5.3.4 Sexual hostility and reputational concerns

Sexual hostility in the working environment was defined as experiencing any of the following: unwanted attempts to establish a romantic or sexual relationship; sexual touching without consent; feeling bribed to engage in sexual behavior; sexual propositions; and threats as retaliation for sexual non-cooperation. Most respondents in the sample reported that they perceived that others like them in the community had ever experienced some form of sexual hostility, ranging from 59 percent to 78 percent of all respondents (Table 18). Women were more likely than men to report that they did not think others like them in the community had ever experienced sexual hostility. There were no differences in perceptions of sexual hostility by beneficiary status.

Table 18. Sexual hostility in the working environment (% of respondents)

	All ^{/a}			Beneficiaries ^{/b}			Non-beneficiaries ^{/b}			Test between beneficiaries and non-beneficiaries	
	Women	Men	Gender gap	Women	Men	Gender gap	Women	Men	Gender gap	Women (B vs. NB)	Men (B vs. NB)
Perceive that others like them in the community do not experience sexual hostility in their working environment	41	22	-19***	35	17	-18***	40	17	-23***	-5	0

Source: IFPRI/Wadonda survey (2019); Note: B=beneficiaries; NB=non-beneficiaries. p<.10 ** p<.05; *** p<.001. Sexual hostility includes the following categories: unwanted attempts to establish a romantic or sexual relationship; sexual touching without consent; feeling bribed to engage in sexual behavior; sexual propositions; and threats for sexual non-cooperation. Sample size ranges from 95 (beneficiary men) to 431 (non-beneficiary women). ^{/a} Includes all five districts where the survey was conducted. ^{/b} For comparability, we restricted the non-beneficiaries to those in the districts where training was conducted in 2019 (Blantyre and Lilongwe).

In the qualitative study, questions around sexual hostility revealed information on social norms and gender roles more broadly. For instance, social norms deem promiscuity unacceptable, which greatly influences women’s interactions with men outside their families and how they may conduct business in their communities. A handful of women graduates shared a few different methods they employ to protect their reputations and, occasionally, their physical safety. All of the methods they employ aim to portray them as faithful, chaste women. In their words,

I make sure I am not promiscuous. (woman graduate, Lilongwe)

I make sure I do not joke with married men. (woman graduate, Lilongwe)

Dressing well is one of the ways I protect myself. When you dress and show some parts of the body that are sensitive, you give room to people to abuse you. You can easily be raped. (woman graduate, Lilongwe)

Despite women graduates’ best efforts to maintain their reputations, community norms may lead people to conclude otherwise about women, particularly those engaged in business. For instance, the mere fact that women are outside of their residences to sell agricultural goods is grounds to conclude a woman is unfaithful or promiscuous. As two women explained,

Sometimes men think that women who do business are doing extra marital affairs. (woman graduate, Lilongwe)

You might go to the market to sell the vegetables, and you know we sell to everyone, both men and women. And people may start saying you are not only selling vegetables; you are also prostituting. (woman graduate, Blantyre)

Considering strong social norms around women’s sexuality in Malawi, such perceptions may hinder women’s ability to participate in agricultural VCs. For instance, women may not be able to generate

income if other community members do not want to be associated with someone seen as having a low social status or to be perceived as unfaithful themselves and thus refuse to purchase their products.

Sexual harassment is another barrier women face in participating in agricultural VCs. Considering that women in business may be perceived as promiscuous or unfaithful simply for appearing in public, some men may consider their being in a public space as an invitation to sexually harass women entrepreneurs. Several women graduates identified such behavior as a constraint to women's participation in markets. As two of these women graduates said,

When we are traveling around, most men enjoy discussing women.... I was doing business selling fritters. I had just started business and one man came to me. He told me that he was convinced that I was doing business because of lack of family care. He proposed that I marry him so that he takes care of me. I explained to him that I was doing business to support my husband and my household. So, in most cases, when men look at women who do business, they think that their husbands have abandoned them and they need care from them. (woman graduate, Lilongwe)

Some men involved in the same business make sexual advances towards women. For women who aren't ready to disrupt their marriages, they will immediately decide to stop their businesses.... It happens that sometimes when you sell vegetables to men and they go like, "young woman, we see you every day selling these vegetables. Does it mean that you don't have a husband?"; worst still sometimes they will try to ask whether you are being cared for by your husband. They try to underrate your husband even if he is a hard working person. Sometimes people gossip at your back. They go like, "even if you see her like doing business, she is actually involved in promiscuous behaviors." (woman graduate, Lilongwe)

Such experiences reveal a complex social terrain that women must navigate as agricultural entrepreneurs. First, other community members may witness these unwanted encounters and use them as fodder for gossip. This gossip may damage women's reputations, and possibly even reach women's spouses. It is unclear if such unwanted encounters may incite household disharmony and/or domestic violence.. For instance, if a man learns someone propositioned his spouse, it is unclear who will be perceived to be at fault (i.e., his entrepreneur spouse or the harasser). Further, in situations where women do choose to sell goods publicly, knowing the risks their reputations face, they must confront men making unwanted advances. Such harassment may dampen women's sense of self-esteem or discourage their participation in these activities.

5.3.5 Safety in the community

Women graduates largely felt that it was safe to move about their communities. Some women acknowledged that violence may be a possibility in their community, though they do not perceive such threats to be widely prevalent. Two women raised the possibility that individuals in their communities may be targeted if they are perceived to have money. As one woman graduate explained,

This [physical threats] too can discourage women to stop businesses especially that it becomes easy to notice when women have money—e.g., after sales, most baskets are empty and women can easily be noticed to have some money. (woman graduate, Lilongwe)

Despite women graduates' perceptions that few threats to their physical safety exist in their communities, a few shared two different strategies they employ to reduce the risk to their physical safety: returning home before nightfall and maintaining good relationships with good community members. In their words,

They may attack you.... You must make sure that you travel when it is still daytime. Come back home at the right time. (woman graduate, Lilongwe)

We usually walk in groups but also make sure that you return back home on time. (woman graduate, Lilongwe)

The other way of protecting yourself is to be at peace with everyone. This way you avoid physical and verbal abuse. (woman graduate, Lilongwe)

5.3.6 Spousal support

Comments from women graduates reveal that women entrepreneurs are not generally supported by their husbands. As women graduates explain, men do not want their spouses to operate businesses for fear women will neglect their domestic duties. In the words of one woman,

Some men don't like their wives to be doing business. Sometimes they will say, "you are not working at home because you are too busy with your business!" (woman graduate, Lilongwe)

Further, some evidence suggests that men in the community explicitly discuss discouraging women from engaging in entrepreneurship and then enforcing such ideas at home. As one woman graduate explained,

Sometimes men prohibit wives to do business because of what they learn from others. They discuss the disadvantages of women doing businesses in their meetings and they come to implement home. This also makes women stop participating in business. (woman graduate, Lilongwe)

Her experience reveals that women's ability to participate in different nodes of agricultural VCs may be moderated by men in the community, regardless of the skills, vision, inputs, and resources women may have to start and maintain a business. Women's entrepreneurship is subject to masculine control at the community level, which emphasizes the importance of engaging men in challenging gendered social norms to upgrade value chains to be more inclusive.

5.3.7 Gossip

Several women graduates noted that gossip is a component of community life, and that gossip may deter women from starting and maintaining enterprises. Respondents inferred that others gossip because some people like discouraging others and to drive them out of business. For instance,

Some people also say that her children are suffering while she eats good things like rice porridge at the market. This is what discourages most women. So, people start gossiping that your business is suffering your children. This is what makes people sit down. (woman graduate, Lilongwe)

Some people like discouraging others. They will say that you won't make any profit from whatever you are doing. This makes some women to stop their businesses. (woman graduate, Lilongwe)

Women are very good at gossiping. They even destroy your reputation. This is meant to make sure that you sit back and stop your business. (woman graduate, Lilongwe)

Social norms around humility and modesty in Malawi, in concert with risk of gossip in the community, may deter women from starting or maintaining businesses, lest their success give their neighbors reason to accuse them of being boastful or prideful. In short, the risk of shame stemming from a perceived violation of social norms around humility may prevent women from becoming entrepreneurs.

5.3.8 Gendered treatment of entrepreneurs

Social norms may dictate the price at which entrepreneurs market their goods. For instance, two women graduates stated that women are deliberately offered below market value prices for their goods. As these two women graduates shared,

Some men will buy from women at a cheaper price than they would do from men and this also discourages women to continue doing businesses. (woman graduates, Lilongwe)

Yes, some men deliberately mistreat women by offering very low prices to women when buying their commodities. With small capital, you end up making losses and failing to continue. (woman graduate, Lilongwe)

There are ramifications for women's income-generation potential if their goods are valued less than men's. Further, the lower market value of women's goods may stem from women having (whether actual or perceived) lower-quality products relative to men due to gendered barriers to accessing resources. Such gendered differences in earning potential highlight the need to challenge gender norms that do not embrace women as agricultural producers and entrepreneurs in their own right and to remove gendered barriers to accessing agricultural inputs.

At the same time, one woman emphasized that her persistence allowed her to overcome the initial discrimination she faced. She said,

At the time I was starting, farming was a man's world. So, when I started, I was not accepted in groups and then people saw how persistent I was...how I would make noise. And now I am working with those men who did not accept me at first. (woman, Lilongwe)

5.3.9 Transportation and market access

Several women graduates, from Blantyre and Lilongwe, lamented the lack of affordable transportation options in their community. As a result, women's income earning potential is constrained because they must pay for expensive transportation to sell their agricultural goods. As a woman from Lilongwe shared,

We have so many challenges; some include lack of people who can lend you a bicycle to use to market your vegetables.... The alternative is difficult. You have to find someone to carry vegetables to the market at a cost. You need to start off at around 3am in the morning and walk to the market...[if you decide to take a bicycle taxi, it costs] K700 but its K1500 or K2500 if you decide to take a motorbike (woman graduate, Lilongwe)

Inadequate transportation options are particularly burdensome for women who live farther from the nearest market; the high transport costs effectively exclude them from market participation. As a woman graduate from Blantyre explained,

Transport is an issue here. The market is far, and transport is scarce; we do not make profits because the transport cost is too high. (woman graduate, Blantyre)

One woman graduate noted that the consequences of lacking transportation options reach beyond that of women's income generation potential. As she explained, children are often left unattended while their mothers take the time needed to walk to the market. In her words,

Yes, sometimes we walk on foot to sell our crops. Sometimes we walk for a long distance to go sell our commodities and we return back home very late. In most cases when we come late, we suffer children a lot because there is no one to cook for them. (woman graduate, Lilongwe)

Her example shows that women's lack of access to transportation affects not only their ability to earn income but also their ability to fulfill expectations around women's domestic and reproductive roles.

6. DISCUSSION

This section addresses the implications of the study results for program implementation and changes in attitudes toward and status of women's empowerment.

6.1. Program implementation

6.1.1 Program structure and implementation

The main role of ATVET4Women is to facilitate and mobilize stakeholders and provide operating funds to existing ATCs to implement the formal and non-formal trainings for skills development in priority agricultural VCs. It relies on the existing structure, processes, and capacity of participating ATCs. As a result, ATVET4Women will be successful only if the ATCs have the capacity and incentives to implement the program activities. To achieve these, the two participating ATCs (Thanthwe Farm and Stephanos) suggested the following for ATVET4Women: (1) contractual agreements and clear roadmap between ATVET4Women and the ATC to guide the implementation of activities; (2) better planning and adherence to schedules; (3) better coordination and regular communication; (4) monetary support to the ATCs and other key stakeholders to assist with program implementation; and (5) support in terms of staff capacity building, equipment, and materials needed for training and demonstrations. These recommendations are echoed in the other three participating ATCs (Kasama, Mbandira, and MVS). In two of the ATCs (Mbandira and MVS) that are targeted for mango training, mango seedlings were reportedly given to the ATCs without clear instructions for care and cultivation or selection criteria for distribution. Key informants also suggested that ATVET4Women revisit its structure and the availability of human and financial resources to ensure it can implement its planned activities. Others noted the need for the program to strengthen awareness of the program to mobilize and incentivize participation across a more diverse set of stakeholders and to help implement these activities.

6.1.2 Selection process of trainees

In the future, clearer selection criteria and a more transparent selection process for trainees are needed. The technical trainings are for different VCs, each requiring different selection criteria. It is not clear how the previous trainees were selected. For aquaculture, potential trainees should already be those engaged in aquaculture production, have a fishpond or land that can be converted to fishponds, or live in the areas suitable for aquaculture and close to a source of water. A source of water is very important for vegetable cultivation and can be added as a trainee selection criteria for training on vegetable production. Two types of training can be offered: training for those already engaged in the VC to upgrade their production; and training to encourage others to start production in a new VC. Each type of training requires a different training strategy.

6.1.3 Training implementation

The graduates suggested quite a few improvements they would like to see to the training:

- More investment in practical sessions
- Provision of training allowances
- Food allowance (provision of food during training)
- More equipment and inputs (e.g., stationary, uniform, boots, work suits) provided during training
- Provision of transportation to/from training
- Certificates after completion
- Instruction in local language(s) and/or provision of an interpreter
- Accountability (supervision from headquarters)

For example, many suggested that the training period was not long enough to cover the volume of the material. Respondents suggested that more trainings be provided during the week. They also pointed out that the student-to-teacher ratios in these trainings were high and students were not being heard. Moreover, some students felt that the teachers were not approachable, so students did not feel comfortable approaching the teacher for clarification. The students also noted that teachers were not mindful of time, with teachers often being late or the trainings going overtime. As one woman shared,

The first one was that our trainers used to come here late. We used to come in the morning but they used to come late say around 3pm and we stayed without any food /snack the whole waiting period. (woman graduate, Lilongwe)

Additionally, poor communication around scheduling was a challenge for some graduates. A woman from Lilongwe explained that she was not able to finish all of the lessons due to poor communication around scheduling. She explained that she came to the training center on the wrong day and/or at the wrong time because the schedule was difficult to follow. In her words,

I wasn't able to finish with them all the planned lessons.... For instance we would be told like today that they were coming to train us. We get to the training venue; we realize that we have been scheduled to attend the next day's training. When you go there the next day, you realized that they are telling you that you missed your schedule the previous day because it was in the afternoon. So, the information flow wasn't good because we were in so many groups.... We were divided into groups and the trainings were timed into sessions that were difficult to follow. Morning session was another group and afternoon session was another group.... Our schedules kept on changing. (woman graduate, Lilongwe)

In addition to improving time management, the students highlighted areas for strengthening the training content. They suggested the introduction of materials on other crops. Women graduates and their spouses both suggested that training provide more information around livestock, additional crops (e.g., beans, cabbage), beekeeping, agroprocessing, access to credit, business management skills, nutrition, and climate change adaptation, as well as instruction on the hard and soft skills needed for agricultural enterprises along different nodes of agricultural value chains.

The need for information on nutrition, business operations, and accessing loans also emerged in the qualitative study. All of these suggestions related to women's income generation potential. For instance, women graduates linked nutrition to health and economic opportunity, explaining that a lack of nutritious foods may constrain their economic potential. As one woman explained,

They can also focus on nutrition for the household so that the families become healthy. Development can only happen when people are healthy. For instance, do you think I can work in my garden when my child is sick? It can't work! (woman graduate, Lilongwe)

The comments about business and loans relate more directly to women's economic activities. Women emphasized learning how to operate a successful and profitable business as an important business skill. As one woman explained,

Maybe skills on how to run a business. Sometimes we run businesses with a lot of ignorance. We need to learn how to engage in profitable businesses and how we can strategize to make more profits in the business. (woman graduate, Lilongwe)

6.1.4 Improving value chain outcomes of the program

A majority suggested the need for additional support for women to upgrade their production facilities beyond the training itself.

Record-keeping is uncommon and general business management practices are very weak for both graduates and non-graduates. ATVET4Women should include and intensify training on record-keeping and business management.

Beyond vegetable production, the program can focus more on market access and develop and support more business models along the value chains. Women can be engaged in farmer-led market surveys to link them to markets. The Smallholder Horticulture Empowerment & Promotion (SHEP) project¹⁰ being implemented by the Japan International Cooperation Agency in Malawi uses a participatory, farmer-led market discovery approach that shows promising signs of connecting horticulture producers to markets. Moreover, developing and supporting women's groups and organizations for group marketing can be explored. The availability of planting materials is an issue that emerged in the interviews, identifying an important opportunity for developing women's businesses in seed multiplication, hatcheries, or nurseries. These types of businesses also address the issue of availability and access to seeds and planting materials, which contribute to overall efficiency of the VC. Agroprocessing through cooperatives or groups can also be intensified by the program.

The program can also explore strategies to enhance beneficiaries' access to credit. Other evidence suggests that trainings are more successful if they are linked to credit provision (Buvinic and Furst-Nichols 2016; Ambler de Brauw and Godlonton 2018). Some studies provide evidence that supporting groups and cooperatives can help in pooling resources, risk management, aggregation, and improving bargaining power, and help address some of these constraints (Brody 2016; zu Selhausen 2016; Baden 2013; Jones, Smith, and Wills 2012). Buyers are also looking for ways to reduce transaction costs and control quality of produce; they prefer working with larger suppliers or aggregates of suppliers. Supporting and replicating the approach of Thanthwe Farm, that is, having a strong nucleus farm/firm to aggregate produce and coordinate farmers through contract farming or similar arrangements, can help to ensure the positive impact of the training on incomes and development outcomes. Studies have shown that women's engagement in contract farming coupled with increased gender awareness at the community level can contribute to changing gendered social perceptions (Adams, Gerber and Amacher 2019).

6.1.5 Promoting the household approach

The qualitative work found that the household approach adopted by the program shows promising signs of changing mindsets among women and men and should be intensified. Social norms on women's domestic responsibilities rather than their roles in entrepreneurship emerged strongly as factors affecting women's participation in agribusiness and should be addressed to increase benefits to women entrepreneurs and their families.

The program's approach of joint training (both the woman and man in the household participate in training) was weakly implemented in the past phase, although it is being more explicitly promoted in the current phase. It is often not feasible to have a man and a woman within the household both attending a training—only one attends so that the other one can work. Having shorter and more practical trainings, selecting convenient time and location of the training, and providing childcare services are some of the approaches that can increase participation of both women and men within the household. The face-to-face training can be complemented with ICT-based extension, for example, on market and price

¹⁰ https://www.jica.go.jp/english/our_work/thematic_issues/agricultural/c8h0vm00009ul5bk-att/shep_05_en.pdf.

information; and reminders and important messages can be sent via mobile phone or radio. The use of radio programs for agricultural messaging is common in rural Malawi, with 46 percent of rural households listening to agricultural radio programming daily.

This workload can also affect the implementation of the mentorship program that is being started by ATVET4Women. Mentors will need to supervise and guide other farmers, so juggling between own domestic work, productive work, and mentoring will be more challenging. Incentives may need to be devised to make the mentorship program successful and sustainable.

6.1.6 Enabling local environment for women entrepreneurship

The local environment also affects participation and empowerment of women. Gender-transformative approaches in the community could therefore be included in ATVET4Women activities. Strong social norms around women's role in reproductive versus productive and business domains and women's sexuality in Malawi may hinder women's ability to participate in agricultural VCs. This limitation stems from the social norm that women should stay home and take care of the family while men do business. Men think that women who do business have been abandoned by their husbands and that they need care (from the men); men erroneously conclude that, because women are outside their homesteads to sell agricultural goods, they are unfaithful or promiscuous. Women may not be able to generate income if other community members refuse to purchase their products because the community members do not want to be associated with someone of low social standing or to be perceived as unfaithful themselves. Such experiences reveal the complex social terrain women must navigate as agricultural entrepreneurs.

Interviews also show that women's ability to participate in different nodes of agricultural VCs may be constrained or moderated by men in their communities, regardless of the skills, vision, inputs, and resources women may have to start and maintain a business. Women's entrepreneurship is subject to community control, emphasizing the importance of engaging men in challenging gendered social norms to make VCs more inclusive. Gender awareness in the community, involving men and women in the household, should be promoted as part of ATVET4Women, alongside its household approach. Qualitative evidence of this community education has been shown in Malawi. Adams, Gerber and Amacher (2019) show that women's engagement in cane farming coupled with increased gender awareness at the community level is contributing to a change in gendered social perceptions and increased valuation of women's abilities and contributions in commercial farming and may be modifying the gender balance at the community level.

6.2. Women's empowerment

The main sources of disempowerment among women and men are lack of autonomy in income and work balance; more than half have not achieved adequacy in these indicators. Fewer women than men achieved adequacy in work balance, signifying a greater time burden for women. Adequacies in attitudes about domestic violence, respect among household members, input in productive decisions, and asset ownership are generally high for both women and men, but significantly lower for women. Indicators on collective agency are generally high and show no gender difference.

Strategies to improve work balance, especially for women, are needed for ATVET4Women to contribute to women's empowerment. Vegetable production still depends on sourcing water through water cans and buckets from nearby rivers, and investments in labor-saving and productivity-enhancing technologies, such as treadle pumps, are much needed. Participation in trainings can increase workload and is likely the reason that the joint training (of both woman and man within the household) was not enforced by ATVET4Women. Almost all households had only one trainee despite the program inviting both and

emphasizing joint attendance. Trainings should also be held in convenient locations, and complementary ICT can be explored. Market agents need to pay attention to local contexts that may likely affect participation and empowerment of women in value chains, including sexual hostility and access to sanitation.

Most women and men lack autonomy in income. Both women and men reported that they are more likely to use income as expected, rather than as they themselves personally want (Annex Figure 1). Low adequacy in autonomy in income may indicate that household incomes are inadequate to meet the needs of household members. This inadequacy could be because of a lack of income-generating activities per se. More income generated through successful agricultural value chains and diversified crops could potentially give women and men more income to use for their needs and improve their autonomy in income.

Access to safe water and reliable sanitation is important not only for women and men's comfort and welfare but also for food safety. Promotion of vegetable value chains should include serious consideration of investments in safe water and reliable sanitation. This should be accompanied by training and capacity strengthening on food safety standards, which will be important for access to lucrative markets and public health.

From the qualitative interviews, we see that the training was successful in promoting the philosophy that "it takes two" to work successfully in farming, and that sex need not be a barrier to value chain participation. However, it also demonstrated the limits of short training courses in the face of discriminatory social norms. Many interviewees, both men and women, identified types of work that women were not suited for because the tasks were perceived to be physically hard or otherwise considered inappropriate. Clearly more work needs to be done in the wider environment to clear the path for more women entrepreneurs in agricultural value chains.

7. CONCLUSIONS

This report has reviewed the implementation of ATVET4Women in Malawi and examined participants' and other stakeholders' views on the program successes and limitations. Results show that most graduates value and are satisfied with the training. An important highlight is that, despite deep-seated social norms and strong resistance from men and women, perceptions are now beginning to change. More respondents believe that farming and business can only succeed if husband and wife (and family members) work together. Both qualitative and quantitative data show that some graduates have practiced what they learned and changed their agricultural practices, shifted crops, and accessed more lucrative markets. However, data also reveal that only a few of graduates were able to change practices to realize observable changes in their production and incomes. Changes in the production, sales, and profits from vegetable production since program inception in 2018 were not significantly different between the graduates and those who did not participate in the program. Major challenges faced by the graduates after the training included the need for (1) better support for market linkages and (2) funds to invest in facilities to enable intensive and high-value vegetable production or agroprocessing.

As the program heads to the next phase, with a greater funding commitment, this report identifies opportunities where ATVET4Women can expand. First, to improve program implementation, there is a need for a clear roadmap, careful planning, and better coordination and communication among stakeholders. It is also worthwhile to revisit the structure and availability of human resources to implement ATVET4Women.

Second, to improve training implementation, the graduates suggested improving logistics, provision of transportation allowance, and adequate training materials. Graduates also recommended inclusion of other topics such as trainings on more crops, more hands-on and practical training, and climate change adaptation. Basic business management skills such as record-keeping and cash flow analysis were lacking among both graduates and non-graduates and should be augmented in the trainings.

Third, according to the qualitative study, the household approach shows promising signs of changing mindsets among women and men. Social norms related to women's roles in the domestic sphere, rather than in their businesses, emerged as a limiting factor in their participation in agribusiness, and should be addressed. Gender awareness in the community and involving men and women in the household should be promoted as part of ATVET4Women, along with its household approach.

Fourth, the program should put more emphasis on market linkages and not just on technical training (production side). The program can explore strategies to enhance beneficiaries' access to credit. The Thanthwe Farm approach is an excellent example of a strong nucleus farm that aggregates produce and coordinates farmers through contract farming or similar arrangements, and it can be replicated.

Last, the main contributors of disempowerment among women and men are lack of autonomy in income and work balance. Fewer women achieved adequacy in work balance than men. A more profitable business can provide greater autonomy in choices and use of incomes for both men and women. Through the program's household approach, women and men working together can help share responsibility and workload, thereby improving work balance. The program can also support investments in productivity-enhancing and labor-saving technologies, such as treadle pumps, to address the lack of work balance, especially for women. The combination of gender-transformative approaches and supporting farmers and entrepreneurs to have profitable businesses can empower both women and men and improve household welfare.

REFERENCES

- Adams, T., J-D Gerber and M. Amacker. 2019. Constraints and opportunities in gender relations: Sugarcane outgrower schemes in Malawi, *World Development* 122: 282-294.
- Ahmed, Akhter U, Hazel J Malapit, Audrey Pereira, Agnes R Quisumbing, Deborah Rubin, Julie Ghostlaw, Md. Latiful Haque, Nusrat Zaitun Hossain, and Salauddin Tauseef. 2018. "Tracking Empowerment along the Value Chain: Testing a Modified WEAI in the Feed the Future Zone of Influence in Bangladesh." Washington, DC: International Food Policy Research Institute (IFPRI).
- Alkire, Sabina, Ruth Meinzen-Dick, Amber Peterman, Agnes Quisumbing, Greg Seymour, and Ana Vaz. 2013. "The Women's Empowerment in Agriculture Index." *World Development* 52: 71-91.
- Ambler, K., A. de Brauw, and S. Godlonton. 2018. *Agriculture Support Services in Malawi: Direct Effects, Complementarities, and Time Dynamics*. Discussion Paper 1725. Washington, DC: International Food Policy Research Institute.
- Baden, S. 2013. Women's collective action in African agricultural markets: the limits of current development practice for rural women's empowerment, *Gender & Development* 21(2): 295-311.
- Brody, C., T. de Hoop. M. Vojtkova, R.W. Pangaea, M.D. Pangaea, P. Murphy, and S.L. Dworkin. 2016. Can self-help group programs improve women's empowerment? A systematic review, *Journal of Development Effectiveness* 9(1): 15-40.
- Buvinić, Mayra, and Rebecca Furst-Nichols. 2016. "Promoting women's economic empowerment: what works?." *The World Bank Research Observer* 31(1): 59-101.
- Farnworth, C., C. Stirling, A. Chinyophiro, A. Namakhoma, and R. Morahan. 2018. Exploring the potential of household methodologies to strengthen gender equality and improve smallholder livelihoods: Research in Malawi in maize-based systems, *Journal of Arid Environments* 149 (2018) 53-61.
- Frese, Michael, and Michael M. Gielnik. "The psychology of entrepreneurship." *Annu. Rev. Organ. Psychol. Organ. Behav.* 1, no. 1 (2014): 413-438.
- GIZ. 2016. "Appraisal Mission Report: Results of the Project Identification Mission 'Qualification of Women in the Agriculture and Food Sector in Africa - ATVET for Women.'"
- Hannan, Anika, Jessica Heckert, Laurie James-Hawkins, and Kathryn M Yount. 2020. "Cognitive Interviewing to Improve Women's Empowerment Questions in Surveys: Application to the Health and Nutrition and Intra-household Relationships Modules for the Project-level Women's Empowerment in Agriculture Index." *Maternal & Child Nutrition* 16 (1): e12871.
- IFAD. 2014. Case study: Household Approach for Gender, HIV and AIDS Mainstreaming, Malawi, Gender, targeting and social inclusion
<https://www.ifad.org/documents/38714170/40205133/Household+approach+for+gender%2C+HIV+and+AIDS+mainstreaming%2C+Malawi.pdf/8d228624-b310-40f0-a74d-cde2b4c28fba>
- Jones, E., S. Smith, and C. Wills. 2012. Women producers and the benefits of collective forms of enterprise Volume 20(1): 13-32.
- Lambrecht, I., Vanlauwe, B., and Maertens, M. 2016. Agricultural extension in Eastern DR Congo: Does gender matter? *European Review of Agricultural Economics*, 43(5), 841-874.
- Malapit, Hazel J, Crossley Pinkstaff, Kathryn Sproule, Chiara Kovarik, Agnes R Quisumbing, and Ruth S Meinzen-Dick. 2017. "The Abbreviated Women's Empowerment in Agriculture Index (A-WEAI)." Malapit, Hazel J, Catherine Ragasa, Elena M Martinez, Deborah Rubin, Greg Seymour, and Agn Quisumbing. 2019. "Empowerment in Agricultural Value Chains: Mixed Methods Evidence from the Philippines." IFPRI Discussion Paper 1881. Washington, D.C.
- Malapit, Hazel J, Kathryn Sproule, and Chiara Kovarik. 2017. "Using Cognitive Interviewing to Improve the Women's Empowerment in Agriculture Index Survey Instruments: Evidence from Bangladesh and Uganda." *Journal of Gender, Agriculture and Food Security* 2 (2): 1-22.
- Malapit, Hazel Jean, Agnes Quisumbing, Ruth Meinzen-Dick, Greg Seymour, Elena M Martinez, Jessica Heckert, Deborah Rubin, Ana Vaz, Kathryn M Yount, and Gender Agriculture Assets Project Phase.

2019. "Development of the Project-Level Women's Empowerment in Agriculture Index (pro-WEAI)." *World Development* 122: 675–92.
- Meinzen-Dick, Ruth Suseela, Deborah Rubin, Marlène Elias, Annet Abenakyo Mulema, and Emily Myers. 2019. "Women's Empowerment in Agriculture: Lessons from Qualitative Research." IFPRI Discussion Paper 01797. Washington, D.C.: International Food Policy Research Institute (IFPRI).
- Myers, Emily; Pereira, Audrey; Heckert, Jessica; Seymour, Greg; Malapit, Hazel; Salazar, Elizabeth. "Improving women's empowerment survey questions for agricultural value chains: An application of cognitive interviewing in Benin and Malawi." In development.
- Ragasa, C., and C. Niu. 2017. *The State of Agricultural Extension and Advisory Services Provision in Malawi: Insights from Household and Community Surveys*. Technical Report. Lilongwe: International Food Policy Research Institute.
- Ragasa, C., and J. Mazunda. 2018. "The Impact of Agricultural Extension Services in the Context of a Heavily Subsidized Input System: The Case of Malawi." *World Development* 105:25–47.
- Ragasa, C., D. Mzungu, K. Kalagho, and C. Kazembe. 2020. *Role of interactive radio programming in advancing women's empowerment and crop and dietary diversity: Mixed method evidence from Malawi*. IFPRI discussion paper (forthcoming).
- Ragasa, C., N-L. Aberman, and C. Alvarez Mingote. 2019. *Does providing agricultural and nutrition information to both men and women improve household food security? Evidence from Malawi*, *Global Food Security* 20: 45–59
- Rubin, Deborah, Cristina Manfre, and Kara Nichols Barrett. 2010. *Promoting Gender Equitable Opportunities in Agriculture Value Chains: A Handbook*. Washington, D.C.: U.S. Agency for International Development.
- Skills and Technical Education Programme (STEP). 2018. *Making Technical and Vocational Training Work for Women and Vulnerable Students in Malawi*. Policy Brief 01, STEP, UNESCO.
- Spielman, D., Azzarri, C. Beintema, N. Makhija, S. and Nico, G. 2019. *Internationally comparable metrics for agricultural extension Data, indicators, challenges, and opportunities*. DLEC presentation given at Addis Ababa, June 2019.
- Thomson Consult International, (2017). *Gender Analysis in Agriculture Technical Vocational Education Training in Malawi*. Baseline Study Report for GIZ
- Van Campenhout, B., Spielman, D., and Lecoutere, E. 2018. "The role of gender in ICT-mediated agricultural information campaigns." Selected paper presented at the International Conference of Agricultural Economists, Vancouver, BC, July 28-August 2.
- Willis, G. B. (2004). *Cognitive interviewing: A tool for improving questionnaire design*. Thousand Oaks: Sage Publications.
- World Bank and International Food Policy Research Institute. 2010. *Gender and governance in rural services : insights from India, Ghana, and Ethiopia*. World Bank and International Food Policy Research Institute, Washington, D.C.
- zu Selhausen, F. M. 2016. *What Determines Women's Participation in Collective Action? Evidence from a Western Ugandan Coffee Cooperative*. *Feminist Economics* 22(1): 130-157

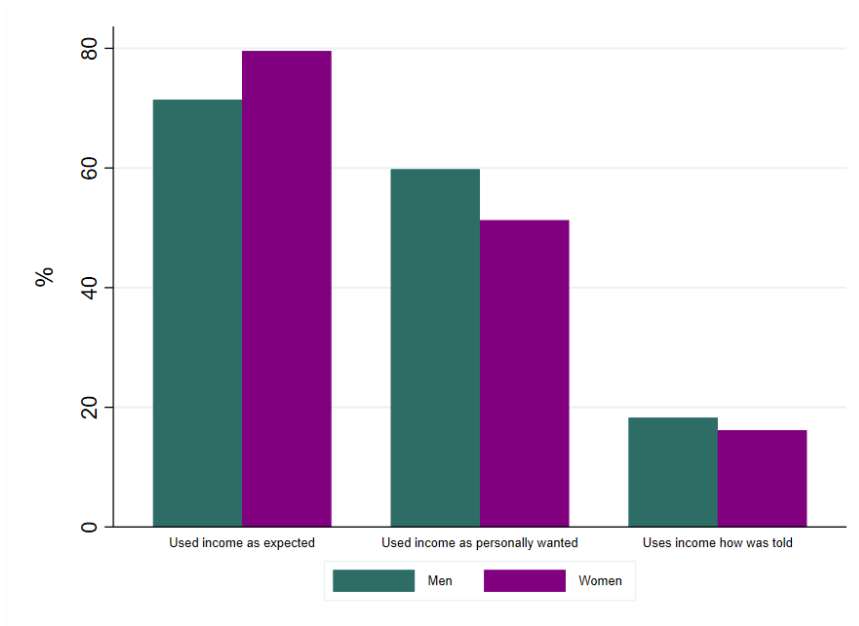
ANNEXES

Annex Table 1. Modules included in the individual and household surveys

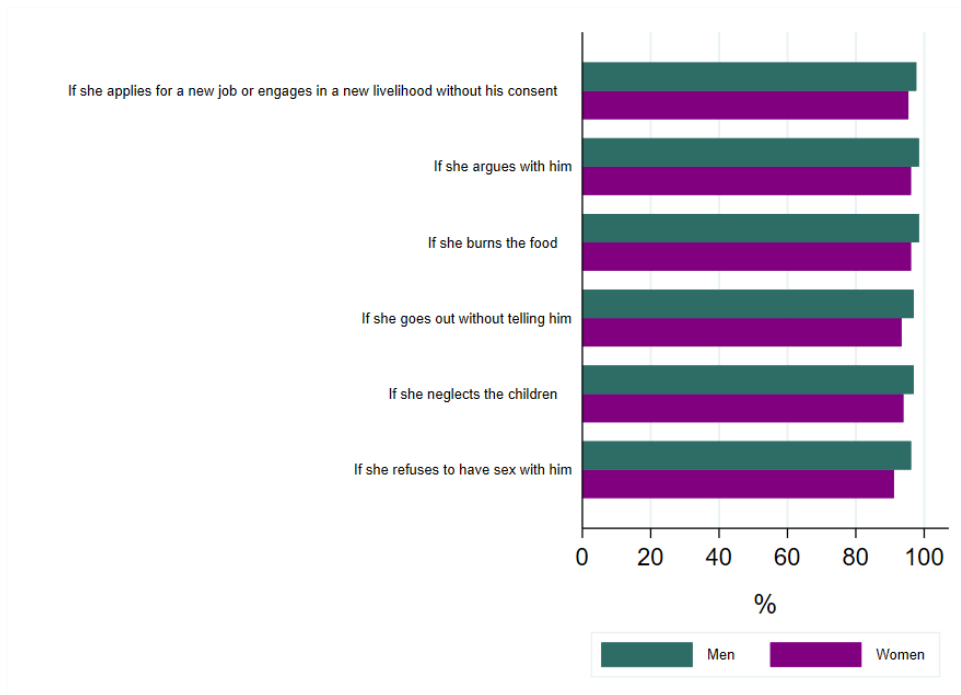
Module number	Module name	Description of Content
Household Questionnaire		
A1	Household identification	Location, language
A2	Focus value chain	Identifies which of the target value chains that the household is active in
B1	Household listing and demographics	Listing of all household members (age, sex, education, marital status, and relationship to primary woman respondent)
C1	Child fostering	Identifies children who are in-fostered or out-fostered
D1	Dwelling characteristics	Physical characteristics of where the household resides
D2	Current household assets	Whether household owns list of assets
D3	Agricultural implements and other productive assets	Ownership of assets necessary to conduct transformation activities on which program participants are trained
E1	Harvest and production	Household participation, management of and investment in value chain activities
E2	Production and sales of the focus VC	Production and sales for target value chain activity
F1	Fixed costs of production of the focus value chain	Whether household rents, owns, or borrows key assets for their target value chain and the cost of doing so.
F2	Variable costs of the focus value chain (women only)	Variable costs incurred related to activities in the target value chain
H1	Family or communal labor of focus value chain	Use of family or community labor for activities in target value chain.
H2	Hired labor	Use of hired labor for activities in target value chain.
I1	Household shocks	Shocks experienced by the household
Individual Questionnaire		
G1(A)	Individual identification	For identifying who the primary respondents are i.e., the beneficiary woman and either her husband or the lead male decision-maker in the household
G1(B)	Participation in ATVET4W value chain training (women beneficiaries only)	Experiences with ATVET4W and knowledge of program learning goals
G1(C)	Participation in other value chain trainings	Other value chain training (not ATVET4W)
G2(A)	Role in household decision-making around livelihood activities	Adapted from pro-WEAI pilots; extent of involvement in decisions related to livelihood activities, including those in the target value chains
G3(A)	Access to productive capital	Adapted from pro-WEAI pilots; sole or joint ownership of productive capital, including land and large and small assets.
G3(B)	Access to financial services	Adapted from pro-WEAI pilots; use of and decisions related to loans and savings accounts
G4	Time allocation and agency	Adapted from pro-WEAI pilots; benefited from cognitive interviewing; amount of time spent in different activities; decision making related to time use and time management
G5	Group membership	Adapted from pro-WEAI pilots; membership in community groups

Module number	Module name	Description of Content
G6	Freedom of movement	Developed for pro-WEAI for market inclusion; benefited from cognitive interviewing; asks about experiences going to different places important for livelihoods, including frequency, whether prevented from going there, whether spouse or partner prevented respondent from going to place
G7	Intrahousehold relationships	Adapted from pro-WEAI pilots; existence of trust and respect among adults in the household
G8(A)	Autonomy in decision-making	Adapted from pro-WEAI pilots; benefited from cognitive interviewing; vignette-based questions that aim to identify reasons for decision making
G8(B)	New general self-efficacy scale and entrepreneurial mindset	Adapted from pro-WEAI pilots and existing scales on self-efficacy and entrepreneurial attitudes; benefited from cognitive interviewing; self-efficacy measures belief in one's ability to do things
G9	Attitudes about violence against women	Adapted from pro-WEAI pilots and existing scales; measures attitudes about whether it is acceptable for a husband to beat his wife.
G10	Food insecurity experience scale (FIES)	Based on existing scale that measures individual experiences of food insecurity
G11	Math skills	Tests application of basic math skills
G12(A)	Access to reliable sanitation	Developed for pro-WEAI for market inclusion; benefited from cognitive interviewing; asks about access to safe places to conduct hygiene-related activities while working
G12(B)	Menstrual hygiene management	Developed for pro-WEAI for market inclusion; benefited from cognitive interviewing; asks about facilities and resources for effective management of menstrual hygiene
G13	Marriage and fertility agency	Developed for pro-WEAI for market inclusion; benefited from cognitive interviewing; asks about decisions related to sex and fertility
G14	Sexual hostility in the working environment	Developed for pro-WEAI for market inclusion; benefited from cognitive interviewing; asks about own experience as recipient of specific sexual hostile behaviors and whether others of the same age and gender commonly experience these acts
G15	History of the focus value chain/commodity	Women's previous experiences working in the target value chain commodity.

Annex Figure 1. Percentage of respondents by indicators of autonomy in income



Annex Figure 2. Percentage of respondents by attitudes about intimate partner violence against women



Note: Estimates are the percentage of respondents who answer that it is not justified for a husband to beat his wife in each of the scenarios.

Annex Table 2. Respondent satisfaction with ATVET training among graduates and similar trainings among non-graduates

	Graduate ^{/a}			Non-graduate ^{/b}		
	All	M	W	All	M	W
<u>Training facilitation</u>				^{/c}	^{/d}	^{/e}
Not satisfied	0.00	0.00	0.00	0.00	0.00	0.00
Somewhat satisfied	0.02	0.00	0.03	0.05	0.02	0.08
Neither satisfied nor dissatisfied	0.04	0.02	0.06	0.04	0.08	0.00 **
Satisfied	0.28	0.41	0.17	0.42 **	0.56	0.32 *
Completely satisfied	0.66	0.57	0.74	0.49 ***	0.34 **	0.60
<u>Overall training implementation</u>						
Not satisfied	0.02	0.05	0.00	0.00 *	0.00 *	0.00
Somewhat satisfied	0.02	0.00	0.05	0.06	0.02	0.10
Neither satisfied nor dissatisfied	0.06	0.05	0.06	0.02	0.04	0.00 **
Satisfied	0.31	0.46	0.17	0.49 ***	0.72 ***	0.30 *
Completely satisfied	0.59	0.43	0.72	0.43 **	0.22 **	0.60
Number of observations	121	56	65	113	50	63

Source: IFPRI/Wadonda household survey (2019). Notes: ^{/a} 80% of ATVET graduates are from Lilongwe, 20% from Blantyre; ^{/b} 85% of non-graduates, initially claiming they were ATVET graduates, are from Chitipa. Statistical significance between graduate and non-graduate (^{/c} All; ^{/d} among men only; ^{/e} women among women only); Values shown are the means; Statistically different at * 10%, ** 5%, and *** 1% level of significance.

Annex Table 3. Percentage of respondents by self-efficacy statements

	Percent who agreed with statement	
	Women	Men
I will be able to achieve most of the goals that I have set for myself	75	78
When facing difficult tasks, I am certain that I will accomplish them	79	80
In general, I think that I can obtain outcomes that are important to me	81	82
I believe I can succeed at most any endeavor to which I set my mind	79	80
I will be able to successfully overcome many challenges	82	82
I am confident that I can perform effectively on many different tasks	80	82
Compared to other people, I can do most tasks very well	78	79
Even when things are tough, I can perform quite well	81	82

Annex Table 4. Percentage of respondents by input in productive decisions

	HH participates in activity		Participates in activity ¹		Had at least some input in decision making ²		Feels like can make decision ³	
	Women	Men	Women	Men	Women	Men	Women	Men
Staple grain farming, processing, trading or marketing	95	92	99	98	96	99	82	98
Value chain farming, processing, trading or marketing (mainly vegetable)	90	92	92	91	98	99	88	97
Large livestock raising (cattle, buffaloes) or processing, trading or marketing of milk, meat or meat products	11	15	72	81	85	100	54	98
Other small livestock raising (goats) or processing, trading or marketing of milk, meat or meat products	42	45	94	97	94	100	73	93
Poultry and other small animals raising (chickens, ducks, turkeys) and processing, trading or marketing of eggs, meat or meat products	61	71	94	95	95	97	81	87
Non-farm economic activities in other sectors (running a small business, self-employment, buy-and-sell)	44	45	89	90	98	100	90	96
Wage and salary employment (work that is paid for in cash or in-kind, including both agriculture and other wage work)	41	23	80	96	99	100	84	100

Note: ¹ Conditional on HH participating in activity; ² Conditional on individual participating in activity; ³ If decision was made jointly.

Annex Table 5. Percentage of respondents by ownership of land and other assets

	Household owns		Respondent solely or jointly owns ¹	
	Women	Men	Women	Men
Land	94	98	87	98
Large livestock	11	12	77	94
Small livestock	51	51	88	99
Poultry/small animals	66	73	92	99
Aquaculture/fishing boat/equipment	1	2	67	0
Non-mechanized farm equipment	97	96	97	99
Mechanized farming equipment	6	7	91	93
Non-farm business equipment	17	23	85	98
House or building	92	88	87	99
Large consumer durables	13	10	84	97
Small consumer durables	54	53	90	99
Cell phone	77	80	79	96
Non-agricultural land	30	28	87	98
Means of transportation	61	68	80	100

Note: ¹ Conditional on household owning item.

Annex Table 6. Percentage of respondents by access to and decisions on financial services

	Household has credit access ¹		Household used credit ²		Respondent solely or jointly decided to use credit ³	
	Women	Men	Women	Men	Women	Men
NGO	61	65	14	14	82	97
Formal lender (bank/financial institution)	49	58	5	3	85	75
Informal lender	20	28	11	12	100	100
Friends or relatives	71	72	50	40	92	95
Group based micro-finance or lending including VSLAs/SACCOs	70	70	66	65	87	95
Informal credit / savings groups (e.g., merry-go-rounds, tontines, funeral societies, etc.)	50	40	31	8	92	85

Note: ¹ Credit is defined as a loan or borrowing cash/in-kind from each source. ² Conditional on household accessing credit. ³ Conditional on household using credit.

Annex Table 7. Percentage of respondents by control over use of income

	HH participated in activity		Respondent participated in activity ¹		Had some input into outputs ²		Had some input on income generated ²	
	Women	Men	Women	Men	Women	Men	Women	Men
Staple grain farming, processing, trading or marketing	95	92	99	98	96	98	95	94
Value chain farming, processing, trading or marketing	90	92	92	91	97	95	96	98
Large livestock raising (cattle, buffaloes) or processing, trading or marketing of milk, meat or meat products	11	15	72	81	83	100	85	98
Other small livestock raising (goats) or processing, trading or marketing of milk, meat or meat products	42	45	94	97	94	99	94	98
Poultry and other small animals raising (chickens, ducks, turkeys) and processing, trading or marketing of eggs, meat or meat products	61	71	94	95	95	96	95	97
Non-farm economic activities in other sectors (running a small business, self-employment, buy-and-sell)	44	45	89	90	99	97	97	100
Wage and salary employment (work that is paid for in cash or in-kind, including both agriculture and other wage work)	41	23	80	96	NA	NA	98	100

Note: ¹ Conditional on household participating in activity. ² Conditional on individual participating in activity. NA = not asked.

Annex Table 8. Percentage of respondents by group membership and membership in influential groups

	Group membership		Membership in influential groups ¹	
	Women	Men	Women	Men
Agricultural / livestock / fisheries producers' group	59	66	38	45
Water users' group	12	18	6	13
Forest users' group	12	28	7	20
Credit or microfinance group	56	35	40	28
Mutual help or insurance group	26	31	19	0
Trade and business association group	10	24	7	16
Civic group (improving community) or charitable group (helping others)	17	23	12	18
Religious group	73	68	57	57
Listening club (related to radio programs)	6	14	4	9
Other group	1	2	0	2

Note: ¹ Inadequate if not a group member.

Annex Table 9. Percentage of respondents by entrepreneurial mindset

	Percent who agreed with statement	
	Women	Men
I will be able to achieve most of the goals that I have set for myself	75	78
When facing difficult tasks, I am certain that I will accomplish them	79	80
In general, I think that I can obtain outcomes that are important to me	81	82
I believe I can succeed at most any endeavor to which I set my mind	79	80
I will be able to successfully overcome many challenges	82	82
I am confident that I can perform effectively on many different tasks	80	82
Compared to other people, I can do most tasks very well	78	79
Even when things are tough, I can perform quite well	81	82
I plan tasks carefully	82	83
I look forward to my work	79	83
I continue to work hard even when I face obstacles	80	83
A person can get rich by taking on an activity that they are not sure will succeed	81	85
It is important for me to do whatever I'm doing as well as I can even if it isn't popular with people around me	80	81
I am motivated to do my work better than I have done in the past	81	83
When a group I belong to plans an activity, I would rather direct it myself than just help out and have someone else organize it	84	83
It is important to me to perform better than others on a task	80	87
I like to have a lot of control over the events around me	81	88
My family and friends would say I am a very organized person	82	84
In uncertain times I usually expect the best	82	84

Annex Table 10. Pair-wise correlation analysis between selected VC outcomes and women’s empowerment indicators

Value chain and empowerment indicators	Vegetable production (kg)	Vegetable yield (kg/acre)	Empowerment score (W)	Empowered (W) (0/1)	Membership in influential groups (W) (0/1)
Vegetable production (kg)	1.00				
Vegetable yield (kg/acre)	0.61***	1.00			
Empowerment score (W)	0.09	0.13*	1.00		
Empowered (W) (0/1)	0.13*	0.15*	0.79***	1.00	
Membership in influential groups (W) (0/1)	0.12	0.18**	0.41***	0.37***	1.00

Source: IFPRI/Wadonda household survey (2019). W=women; Values are the correlation coefficients. Covers all 5 districts. Statistically different at * 10%, ** 5%, and *** 1% level of significance.

Annex 1. Qualitative protocols

The qualitative protocols used for this study are available [at this link](#). Enclosed in this file are the interview guides for:

- Consent form
- Beneficiaries (women and men)
- Non-beneficiaries (i.e., control group)
- Entrepreneurs
- Instructors
- Other stakeholders

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