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WOMEN (DIS)EMPOWERMENT STATUS IN AGRICULTURE: THE CASE OF BOTSWANA PARTICIPANTS IN LIVESTOCK MANAGEMENT AND INFRASTRUCTURE DEVELOPMENT PROGRAMME

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ABSTRACT

The study was carried out to determine the level of women (dis)empowerment in agriculture among the participants of Livestock Management and Infrastructure Development (LIMID) Programme in Botswana with a view to establishing factors contributing to their (dis)empowerment status. A total of 370 women and 97 males within dual households of women beneficiaries were randomly selected. Five domains of Abbreviated Women's Empowerment in Agriculture Index (A-WEAI) was used in analysing women (dis)empowerment. The results showed that women beneficiaries were not empowered in agriculture. While decision making in household income was considered to be less contributing to women's disempowerment; workload/time-use was highly detrimental to women's empowerment. The women's empowerment status is almost satisfactory but there is room for improvement. Policy makers should consider socioeconomic factors to ensure sustanaible rural development. Gender transformation and agricultural incubation framework be developed to promote sustainable agricultural production and sustainainability of the LIMID programme on women's empowerment.

Keywords: A-WEAI, Women, Empowerment, Agriculture, Programme participants, Botswana

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INTRODUCTION

Women's empowerment measures the degree of agency possed by women , which includes control or power over agricultural production to improve their lives (Onori *et al*., 2021). In addition, it includes possession of social and economic attributes such as decision-making in production activities, household income, resources, credit, participation in groups and workload (Danso-Abbeam *et al*., 2018). Consequently, the agricultural sector of many emerging countries are underperforming partly due to women inaccessibility to tools and necessary platform required to maximise their potentials (Anik & Rahman, 2020). Furthermore, women who participate as farmers, unlike their male counterparts, are confronted with more barriers in gaining access to productive resources, markets, and services in nearly every developing country, Botswana inclusive. Consequently, productivity and contribution to agricultural and broader economic and social development goals are hampered by the gender gap (Sharma *et al*., 2020). Hence, eliminating the gender gap in agriculture would have far-reaching social and economic benefits, most especially, among women. Gender inequality is influenced by social and economic factors that could be internal and/or external (Tabassum etal., 2019). All these are the root cause of women's persistent vulnerability which leads to unstastinable agricultural practices, hence unsustainable women economic empowerment interventions if care is not taken (OECD, 2019).

Several authors have contributed to women study in the field of agriculture. For instance, Singh *et al.* (2019) examined women's participation in agriculture in India; Udemezue and Odia (2021), in Nigeria, looked at "gender disparities and roles of women in agriculture"; Peralta (2022) studied "the role of men and women in agriculture and agricultural decisions in Vanuatu". Botswana government, like many other developing countries, has been developing agricultural oriented interventions to curb food security and poverty. In recent time, Livestock Management and Infrastructure Development (LIMID) programme was developed as an intervention in poverty alleviation in rural areas. This includes a small-stock package given to citizens considered poor in the rural areas in which women and youth are given priority (Binge, Mshenga, Kgosikoma, 2019; MoA, 2022). However, while few studies have contributed to the field of women in agriculture in Botswana, the current (dis)empowerment status of women beneficiaries of LIMID is yet to be determined, hence this study.

It is against this background that this study provides answers to the following research questions:

1. What is the empowerment status of women participants in LIMID programme?
2. To what extent do women empowerment factors contribute to their (dis)empowerment status in agriculture?
3. To what extent has the LIMID programme empowered women in Agriculture?

LITERATURE REVIEW AND THEORETICAL UNDERPINNINGS

One of the most crucial aspects of rural women's empowerment is the ability to work in agriculture (Obayelu & Chime, 2020). In smallholder agriculture, women play critical roles as farmers and businesswomen. In many third-world nations, women make up most of the agricultural workforce; nevertheless, the specific roles that men and women play in agriculture can differ significantly depending on location, culture, and crop (Mahofa *et al*., 2022). Women are not only playing an essential role in agriculture but they are also shouldering domestic responsibilities. Increased agricultural output and household food security are two areas directly influenced by the status of women in society (Kent, 2018). It is expected that a woman with the freedom on decision making on production will run a flourishing agricultural business. More so, she will be able to take care of herself and the entire household at large (Shakil, 2021). According to (Chhetri *et al*., 2021), if gender gap in access to productive resources and opportunities is reduced, agriculture productivity might improve by 20-25% to fulfil food security and hunger elimination. Efforts to

empower women encompass a wide range of issues, including autonomy in production, asset ownership and access to and control over the use of revenue, and credit decision-making and control (del Barrio *et al*., 2021). These are different facets of women's empowerment that stem from different definitions of the term.

Providing rural women with access to agricultural loans and educational opportunities has significantly increased agricultural output (Ragasa *et al.,* 2021). Through formal education, women get the information, competence, and assurance they need to take an active role in shaping the future, consequently, the economic growth rate will increase, and poverty will decrease (Haug *et al*., 2021). In livestock industry, women's participation is found to be high because of the sector's critical role in women's well-being and economic advancement. For instance, at the global level, among the 400 million people making their living from cattle rearing, it is established that women make up roughly two-thirds (Quisumbing *et al*., 2022).

Theories of agency or power and critical consciousness are explored in offering explanations to women (dis)emplowerment in participation and understanding of factors contributing to their empowerment. Flor (2021) defines empowerment as a process by which those denied the ability to make a strategic life choice acquire such an ability. The author considers empowerment as a change from disempowerment to empowerment by expanding people's ability to make first-order decisions that can result in desired outcomes.

Further to the understanding of factors influencing women's (dis)empowerment, Waite (2021) suggests conceptualising awareness through critical consciousness - the first step to be considered in the empowerment process followed by agency and resources. It is the social and cultural factors that may come from the household dynamics and the community. It is evident that women's empowerment in agriculture is dynamic and diverse, hence the call for participatory and pluralistic extension approaches for sustainable devlopment. Participatory extension approach promotes recognition of local knowledge and ownership of the development programme by the prospective beneficiaries or farmers. The theory of change by Women Organising for Change in Agriculture and Natural Resources (WOCAN, 2016) emphasizes the starategic support from relevant stakeholders to create enabling environment for women's empowerment in agriculture, hence pluralistic extension system. The basic advantages of pluralistic extension are that the available resources are rationally allocated and creates opportunities for farmers to get support from diverse sources (Lamm et al.,2021), thus catering for the diversity of agriculture and development. Therefore, participatory and pluralistic extension in women's empowerment in agriculture are the basics for environmental, economic and social sustainability hence the continuity of agricultural production and women's empowerment interventions.

MATERIALS AND METHODS

The study was carried out in one of the agricultural districts of Botswana, which is differently demarcated from administrative districts. The agricultural districts are Southern, Southeast, Central, Northern, Northeast, Kgalagadi, and Ghanzi. However, central district was purposively selected for the study because of the higher population of women beneficiaries in LIMID programme (LIMID Office, 2020). The central district has seven agricultural sub-districts: Mahalapye, Palapye, Serowe, Boteti, Tutume, Tonota and Bobirwa as shown in figure 1.

Figure 1: Seven sub-districts of the Central District of Botswana

Source: Central District Council, (2021)

Two sets of population were used in the study. First, the district's population of 9,583 women beneficiaries from 2014 to 2018 was clustered into seven (sub-districts) from which four (4) clusters and a total of 370 women beneficiaries viz: Palapye (36), Mahalapye (68), Boteti (155) and Tutume (111) were randomly selected for the study. The number of beneficiaries per selected cluster was proportionally calculated due to differences in the sizes of their population. Second, the population of 129 identified principal male decision makers in the dual households of women beneficiaries in the District, among which 97 consented to participate in the study. This was designed to measure gender parity in dual households (households with female and male concurrent decision makers) using the five domains of Abbreviated Women's Empowerment in Agriculture Index (A-WEAI) tool (Muriel *et al*., 2019).

Measurement of Women's Empowerment in Agriculture

The study adapted Abrreviated Women's Empowerment in Agriculture Index (A-WEAI) tool. A-WEAI was developed in 2014 by the International Food and Policy Institute (IFPRI) as second version of the original Women's Empowerment in Agriculture Index (WEAI) (Malapit *et al*., 2014). WEAI is a fundamental women's empowerment measuring tool specifically in the agricultural sector. It is used to determine the empowerment status and track effect of agricultural development interventions on women's empowermt specifically focusing on agency and inclusion.

Women's empowerment in agriculture was measured using five domains A-WEAI : a) decision-making on agricultural production, b) decision-making on household income, c) ownership and access to resources (capital and credit), d) workload/time-use and e) women's participation in social groups. These domains are built from social, economic, human capital factors which inturn have influence on the farming environmental use, hence the tool takes after the preposition sustainable development pillars (Purvis, Mao & Robinson, 2019). Based on some theories and literature review, development is defined as a process whereby people "initiatie new structures, coping with problems, adpting to continuous change and striving purposevily and creatively to attain new goals through rational and sustainable use of natural resources (Mensah, 2019, pp4.)

The A-WEAI has two sub-indices: empowerment score (5DE) and Gender Parity Index (GPI). Empowerment score is the average empowerment score of the five domains while GPI is, the inclusivity of women in the five domains in dual households. In other words, GPI is the degree to which women's empowerment score on the five domains (5DE) is equal to, or is more than the 5DE (≥5DE) of the principal male decision-makers in their households. Therefore, the overall Abbreviated Women's Empowerment Index (A-WEAI) is a composite of 90.00% of women's 5DE and 10.00% of GPI (Gupta *et al*., 2019), making a maximum degree of 1. The A-WEAI tool equally reveals (dis)empowerment score, which is an average score of the five domains, and how each of these domains contribute to (dis)empowerment score.

Women's empowerment score

Therefore the computation of women's empowerment score is:

5DE = 1- M0 where M_0 is disempowerment index and M_0 = 1- 5DE

The disempowerment index enables the decision-maker to focus on the situation of the disempowered because it specifically picks the domains and indicators that contribute to the disempowerment score.

Gender parity index (GPI)

The gender parity index has a maximum value of 1. It is the level at which women's empowerment score is different from that of counter males in the household. It is measured by subtracting the product of the percentage of households that are inadequate in gender parity and gender gap from the value 1. That is:

GPI= 1 – (proportion of households inadequate in gender parity X Gender gap) OR

Therefore, proportion of of households inadequate in gender parity (H_{GPI}) is;

$H_{GPI} = h/m$

Where ***h*** is the number of households classified as inadequate in gender parity and *m* is the total dual adult households in the population.

Thereafter, an empowerment gap is to be computed. It is the average of differences in the individual empowerment score of a women and principal male decision-makers in the same household. A household is considered to be enjoying gender parity when the adequate or empowerment score of the women is equal to or more than that of the male decision maker in the same household. In this manner, to get the empowerment gap, the empowerment score is computed only in dual households that are inadequate in gender parity (I_{GPI}).

Therefore;

$I_{GPI} = 1/h \sum^{h}_{j} = 1c'(k)^{W} - c'j(k)^{M} / 1 - c'j(k)^{M}/h$

Where $\boldsymbol{c'j(k)^{W}}$ and $\boldsymbol{c'j(k)^{M}}$ are the censored inadequacy scores of the primary woman and man respectively, living in household **j**, and h is the number of households that are gender parity inadequate. Therefore, the GPI is computed as follows:

GPI = 1- (H_{GPI} X $_{IGPI}$)

Abbreviated women's empowerment in agriculture index (A-WEAI)

Women's empowerment in agriculture index is the level at which women in a particular locality are empowered in agriculture. It is computed by the average empowerment scores of the five domains of women and the gender parity index. The average empowerment score (5DE) of women contributes 90% to WEAI and the gender parity index (GPI) contributes 10%. Therefore:

A-WEAI = (5DE X 0.9) + (GPI X 0.1).

Therefore, contribution of domains/indicators to disempowementis computed as; $=(W^{i}I^{i}/Mo) \times 100$

Where W^i= weight of indicator and I^i= censored headcount (Number of women who had gender parity inadequacy).

Ethical Clearance Issues

Ethical clearance approval was issued by the Institution Review Board of University of Cape Coast, Ghana after undergoing the detailed procedure of conducting the study. Furthermore, the Ministry of Agriculture, Botswana approved the request to conduct the research since the programme evaluated in the study is executed by them.

RESULTS AND DISCUSSION

Status of Women's Empowerment on Agriculture of the LIMID Participants

The overall women's empowerment in agriculture for the LIMID programme's beneficiaries in the Central District of Botswana is presented in Table 1. Respondents who achieved an average of 0.80 or more on the 5DE score were considered as being empowered whilst those with scores less than 0.80 were considered disempowered (not achieving empowerment) based on the formula and interpretation of the A-WEAI tool (Feed the Future, 2018). The implication is that each domain carries an empowerment weight of 0.20. In other words, an individual should meet the minimum requirement of a threshold score of four domains out of five for her to be considered empowered in agriculture. As shown in Table 1, the empowerment score of the five domains (5DE) for all the women is 0.79, and thus disempowered by 0.21. On the other hand, the empowerment score of principal male decision-makers is higher (0.81) than that of women (0.79) by two percent. Regarding the definition of being "empowered" in agriculture, according to A-WEAI, the beneficiaries are not empowered in agriculture because they cannot meet the threshold of 0.80 5DE while male principal decision-makers are empowered (Addison *et al.*, 2021). However, the results are better than women's empowerment scores in other countries. For instance, in Ethopia and Nepal, the 5DEs of women, which are as significant as 0.56 (Cullen, 2021) and 0.58 (Boshe *et al.*, 2021), respectively.

Based on this, the results show that most (53.51%) women beneficiaries are empowered, while 44.49% are disempowered. The 5DE score for disempowered women is 0.66. They failed to reach the empowerment threshold (0.80) by 0.14. Comparatively, more (70.18%) principal male decision makers are empowered than women, but the 5DE of those disempowered (0.58) is less than that of disempowered women by 0.08. The results hint that some women may be more empowered in some factors but less in others.

Furthermore, the lower 5DE of disempowered male decision-makers indicates that these men are decision-makers in their households but are not heads of the households, as revealed by the women. Regarding women's empowerment in agriculture, all the variables involved are essential. Therefore, there is a need for balance in their adequacies. With this being said, it is evident that empowerment is more than just accessibility to resources (Combaz & Mcloughlin, 2020) but includes other features such as workload and social interactions.

The Gender Parity Index (GPI) is as high as 0.93 (See Table 1). This means that the women beneficiaries and the male decision makers in their household have almost the same degree in decision-making, ownership and access to resources, participation in groups and workload on average. The high GPI is confirmed by the low empowerment gap between the genders, which is as low as 0.11. These findings indicate fewer inequalities in empowerment between men and women, resulting in a higher GPI and a lower empowerment gap. A low empowerment gap is a confirmation of mutuality between women and men in the same household or the independency of women, which are positive attributes of women's empowerment For instance, Kenya has shown improved maize yields in dual households (Diiro *et al.*, 2018) as compared to maize fields monitored by female only households. Basically, given the 5DE of 0.79 and GPI of 0.93%, this study's women's empowerment index is 0.80. This is a composite degree of women's

empowerment in agriculture, which considers the empowerment of individual women and the dynamics of decision making of other household members. Lower empowerment gap and high gender parity index is an indication of gender inclusion which shows the fulfilment of sustainable development goal number five (gender equality). Gender equality is a positive foundation of the use of proper agricultural practices and profit making hence drives stable agricultural development (Agrwal, 2018).

Table 1: Abbreviated-Women's Empowerment in Agriculture Index scores

	Estimate	
Variable	**Women n(370)**	**Men n(97)**
Empowerment score 5DE (1-Mo)	**0. 79**	**0. 81**
Disempowerment score [Mo] (1-5DE)	0. 21	0. 19
Number of observations	370	97.00
% Of women/men achieving empowerment	53.51	70.18
% Of women/men not achieving empowerment	46.49	29.82
Mean 5DE score for not yet empowered women/men	0. 66	0. 58
Mean disempowerment score (1-5DE) for not yet empowered women/men	0. 34	0. 42
GPI	**0.93**	
Number of dual-adult households	97	
% Of women achieving gender parity	33.33	
% Of women not achieving gender parity	66.67	
Empowerment Gap	0.11	
A-WEAI	**0.80**	

5DE = Average Empowerment score; Mo= Disempowerment score; n=370; 5DE= 0. 79; GPI= 0. 93;
A-WEAI = 0.80

Contribution of Each Indicator to Women's (Dis)Empowerment in Agriculture

This section presents results on how each indicator contributes to the (dis)empowerment of the beneficiaries. The indicator contributing less to disempowerment indicates that it contributes more to empowerment, hence, more women are empowered. However, Malapit *et al.* (2014) clarified that an indicator that contributes more than its A-WEAI indicator weight (that is, decision making in agricultural activities=0.20; decision making on household income=0.20; ownership of assets=0.13; access to and decision making on credit=0.07; workload/time-use=0.20; and participation in groups=0.20) to the disempowerment score (M_o) is controversial to the empowerment of women. Table 2 summarises the contributions of A-WEAI indicators to disempowerment for both women and men. The indicators' contributions were computed based relative to the disempowerment score of the women beneficiaries (0.21) and that of principal decision makers (0.19).

Table 2: Contribution of each indicator to the disempowerment of women

Statistics	Production	Income	Resources		Time	Group participation
	Decision-making on agricultural activities	Decion-making on household income	Ownership of assets	Access to and decision-making on credit	Workload/Time use	Group membership
Indicator weight	0.20	0.20	0.13	0.07	0.20	0.20
Women						
% Censored headcount	6.76	1.08	12.16	58.11	55.41	13.51
Contribution by indicator %	6.43	1.03	7.53	19.37	52.77	12.87
Contribution by domain %	6.43	1.03	26.90		52.77	12.87
Men						
Censored headcount %	1.75	3.51	70.18	24.56	22.81	22.81
Contribution by indicator %	1.65	3.31	43.42	8.18	21.72	21.72
Contribution by domain %	1.65	3.31	51.60		21.72	21.72

n= 370 (Women); n=97 (Men)

Indicators least contributing to women's disempowerment

This section presents indicators that are least contributing to women's disempowerment score. These include decision-making on household income; decision-making on agricultural activities; ownership of assets; and group participation (See Table 2).

The first least contributing indicator to women's disempowerment is decision-making on household income, which contributes 1.03% to 0.21 overall women's disempowerment. Only 1.08% of the 370 beneficiaries are disempowered, as per the censored headcount in Table 2. This confirms the claim made by some of the women that they are the overseers of their households. These women indicated that they have responsibilities such as sourcing income for manning the households; caretakers of the sick/elderly/young; responsible for agricultural production, food preparation, among others. The majority (60.5%) are single and claim to be heads of the households. The lower empowerment gap also could have contributed, implying inclusivity in the decision-making of the women in dual households.

As elders or breadwinners in the households, they are responsible for income generation. Women's involvement in decision-making on household income is a powerful attribute of empowerment because their priorities lie with the household's welfare compared to men's (Quisumbing *et al*., 2021). Other than this, women with powers over household income have been shown to realise many benefits, including high agricultural productivity and involvement in the value chain of agricultural production, increasing the ability to adapt to economic, climate change and health shocks (Petrulla, 2021). This is an indication of lifting women from poverty trap through diversification of income generation and creating employment for other people in the rual area consequently achieving transformative sustainable rural development by reducing extreme poverty for all (FAO, 2019).

Women's decision-making in agricultural production activities is the second least contributor to women's disempowerment. The results show that this indicator disempowers less than 10% (6.76%) of the beneficiaries. The indicator contributes 6.43% to the overall disempowerment (0.21). The indication is that it contributes highly to women's empowerment. This shows that most women (>90%) have power over household agricultural production. The ability of women beneficiaries of LIMID to make decisions on what crop to plant or what livestock to rear; and how to manage the farm is very advantageous because it will be based on the need of the household. Making decisions on agricultural production is an opportunity to plan for a working management schedule based on available resources such as labour, time, assets and competency hence high chances of getting high yields. It is evident that Botswana women are not only involved in the laborious agriculture work but also contribute to the decision-making of farming activities. Shabaz et. al (2022) explained that women's involvement in agricultural production activities does not only boost sustainability of production but also environmental sustaibility. However, there are differences in women's emporwerment in different countries due to geographically different cultures (Patridge-Hicks, 2020).

The results further expressed that the third least contributing indicator to women's disempowerment is ownership of assets contributing 7.53% to 0.21 disempowerment score. Few beneficiaries (12.16%) have inadequately met this indicator's empowerment. This indicator contributes way below its weight (13%). Assets or resources in agricultural production are the most critical inputs of production. Improving women's power over economic resources improves their moral entitlement and economic status (Christopherson et al., 2022).

Resources such as land, farm implements and income are essential in production depending on the agricultural enterprise. This is a good status for these women to be empowered on because generally, poor women in other developing countries usually do not have ownership and access to assets (Myamba, 2020). Additionally, ownership of assets by women farmers is a significant factor that could alleviate poverty and food security since women are already major contributors to the sector (Ankrah, Freeman & Afful, 2020). Ownership of assets is forms the instrumental agency and economic advancement which are some of the important aspects of sustainable women's economic empowerment (Williams, 2022).

Participation in groups is the fourth least contributing factor to women's disempowerment. It contributes 12.87% to women's disempowerment, which is less than its indicator weight (20%) by approximately 7.00%. The results further show that most women (>86%) are empowered in this indicator since only 13.51% are disempowered, as per the censored headcount in Table 2. During the focus group discussion, the women revealed that among the social groups in their villages, they are more active in church groups than agricultural groups. The women in all four sub-districts explained that they were not in any small-stock or livestock production group or association. They know that the farmers' associations are mainly for people who the extension agents choose in the big villages. These farmers' associations in the villages are composed of farmers who are advanced in farming. They only get limited

information from them, especially on the dates of agricultural shows in the district but nothing more. The beneficiaries indicated that they rarely get agricultural information at churches because they go there on Sundays for less than two hours and return to their homes. This is disadvantageous to farmers because they are not exposed to information and discussions about agricultural production, hence no networking. Abdu, Marquis, Colecraft, Dodoo and Grimard, (2022) revealed that women's participation in agricultural groups is associated with their sustainable empowerment and recommended that this should be considered during the development of empowerment interventions.

Women may be empowered in this aspect, but the type of group they interact with does not form the sufficient basis for the exchange of agricultural information compared to agricultural groups. For example, in Tanzania, the agricultural women's group positively improved women's empowerment in agriculture (Othman, Garrod & Oughton, 2021). Women's participations in agricultural groups in Tanzania were also found to significantly aid in improving women's control over household income (Abdu et al, 2022).

On the contrary, it is essential to note that group participation is not only for exchanging information but acts as springboard to leadership. The voice of LIMID women beneficiaries could start to be heard in groups at community levels and grow to hold positions, eventually joining national groups (USAID, 2021). Participating in groups is a form of building confidence and self-esteem and grooming into leadership.

Indicators highly contributing to women's disempowerment

The results further showed that more than half of the LIMID beneficiaries are disempowered by these two domains; workload/time-use; and access to and decision-making on credit. The two indicators are controversial to women's empowerment because they contribute more than their indicators' weights. This indicator was discussed in detail in the following sections (See Table 2).

Workload/time use is the most contributing indicator to women's disempowerment. It contributes 52.77% to women's disempowerment (0.21), which is higher than its indicator weight (20%), as shown in Table 2. More than half (55.41%) of the beneficiaries are disempowered in this indicator, and only 44.59% are empowered. The implication is that beneficiaries of the LIMID programme have many responsibilities and hence spend more time (>10.50 hours per day) on laborious work (Komatsu et al., 2018). High women's workload or time-use is one social sustainable standard that forms women's exclusion from extension training which is the main basics of continual agricultural development (Armbruster, Solomon, Blare & Donovan, 2019). Livestock farming in Botswana could significantly impact women's empowerment but it is influenced by women's social roles and beliefs, which affect their production (Must & Havorka, 2019).

The accessibility of women to credit is the second most contributing indicator to women's disempowerment. Almost two-thirds (58.11%) of the 370 beneficiaries are disempowered, leaving approximately 40% empowered on this indicator. The indicator contributes 19.37% to disempowerment, which is almost triple its indicator weight (7%), as shown in Table 2. Beneficiaries' accessibility to and decision-making on credit is detrimental to their empowerment in agriculture because it limits them from investing in agricultural production. There is evidence that women's empowerment programmes in Botswana fail to empower the beneficiaries economically because they are not business-minded and have a poor market and credit accessibility (Botlhale, 2017).

Unaccessibility to credit by the LIMID beneficiaires may be a challenge to the use of the right agricultural inputs which may threaten green development in the long run (Chaiya, Sikanda, Pinthong, Saqib & Ali, 2023)

The Effect of the LIMID Programme on Women's Empowerment in Agriculture

With reference to a baseline data of a survey conducted in Zambia (Malapit et al., 2014), the programme has inadequately empowered women in agriculture as presented in Table 3. The women's empowerment in agriculture index value for this study is 0.80 based on the empowerment score (5DE) of 0.79 and gender parity index of 0.93 as discussed earlier. Similarly, the 5DE of the baseline study is also 0.79 but the GPI is 0.89, hence 0.80 empowerment index for the baseline study.

Nonetheless, the programme has improved the gender parity of the beneficiaries by 4% (0.93% LIMID beneficiaries and 0.89% for baseline study). The most positive contributing factors to women's empowerment in agriculture is the higher GPI for LIMID beneficiaries and less empowerment gap of 0.11 compared to 0.20 of the baseline study.

Table 3:The Effect of LIMID Programme on Women's Empowerment in Agriculture Relative to Baseline Value

Variable	**Estimate**		
	Study Value	**Baseline Value**	**Differences**
Empowerment score 5DE (1-Mo)	0.79	0.79	0.00
Disempowerment score [Mo] (1-5DE)	0.21	0.21	0.00
GPI	0. 93	0.89	0.04
Empowerment Gap	0.11	0.20	-0.09
WEAI	0.80	0.80	0.00
Domain's contributions to women's disempowerment (%)			
Decision-making on agricultural activities	6.43	12.5	-6.07
Decision-making on household income	1.03	4.5	-3.47
Access to productive resources	26.90	29.20	-2.30
Workload/time-use	52.77	31.30	21.47
Participation in groups	12.87	22.40	-9.53

With regard to women's disempowering factors, participants in the baseline study were disempowered by workload accounting for 31.30%, access to resources 29.20% and participation in groups (22.40%). On the other hand, only two domains contributed less to disempowerment (decision-making in agricultural production=12.50%; and decision-making on household income=4.50%). Therefore, relative to the baseline value, the LIMID programme has improved women's emporwerment on four domains namely decision-making and access to resources (2.30%); decision-making on household income (4.50%); decision-making on agricultural production (6.07%); and participation in groups (9.53%).

Nevertheless, the LIMID programme failed to improve the beneficiairies' workload or time-use since there is an increase of (21.57%) on contribution to disempowerment compared to the baseline study data. The programme did not improved some aspects of women's empowerment possibly due to failure comprehensively and strategically instil both the economic and social aspects of

empowerment by the LIMID programme developers and implementers. There is history that, social and psychological factors deprive women in Botswana from being empowered by develolopment interventions including agricultural oriented ones hence a call for policy makers revisit the women's empowerment policies (Must & Hovorka, 2019).

CONCLUSION AND RECOMMENDATION

In conclusion, the women's empowerment in the five domains of A-WEAI is almost satisfactory but needs improvement to reach or exceed the threshold to be considered empowered to improve the overall empowerment index. Generally, the women are disempowered in agriculture. However, the beneficiaries women now have satisfactory control and power over household income, agricultural production, resources, group involvement, and gender parity. Furthermore, there is low gender gap in the women's households, hence high gender parity, thus showing gender inclusivity at household level. On a different note, the women are highly disempowered by their daily workload/time-use and access to credit. That is, the women have the challenge of spending more time on laborious work since they have a lot of household chores. This is one factor that could compromise time devoted for agricultural production hence low returns. Even though they have decision-making and access to productive resources, the status of women on access to and decision-making on credit is disempowering the women beneficiaries. Being disempowered by workload and access to credit by the LIMID programme's beneficiaries is a stumbling block to their stable socioeconomic development. All in all, the LIMID programme has not improved the empowerment status of the women with women's time-use being the main challenge. Therefore, economic factors are as important as social factors in women's empowerment in agriculture.

To improve the level of women's empowerment in agriculture, the Ministry of Agriculture should develop a framework for improving women's workload/time-use and accessibility to affordable credit while at the same time reinforcing their agency on agricultural production, household income, resources and participation in social groups. The policymakers and extension sector should consider the introduction and usage of gender transformative and incubation approaches to lessen the workload and improve accessibility to credit for better agricultural production which promotes sustainable production . It is important for the policy makers to consider both economic and social factors at the development stage of empowerment interventions.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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REFERENCES

Abdu, A., Marqins, G., S., Colecraft, E., K., Dodoo, N. & Grimard, F., (2022). The Association of Women's Participation in Farmer Based Organisations With Female and Male Empowerment and its Implications for Nutrition-Sensitive Agricultural Interventions in Rural Ghana.*Current Development in Nutrition, 6*(9):1-11.

Addison, L., Schnurr, M., A., Gore, C., Bawa, S. & Mujabi-Mujuzi., S., (2021). Women's Empowerment in Africa: Critical Reflections on Abbreviated Women's Empowerment in Agriculture (A-WEAI). *African Review Studies, 64*(2):276-291.

Agarwal, B., (2018). Gender Equality, Food Security and the Sstainable Development Goals. *Current Opinion in Environmental Sustainability, 34(*2018)26-32. https://doi.org/10.1016/j.cosust.2018070.

Anik, A. R., & Rahman, S., (2020). Women's Empowerment in Agriculture: Level, Inequality, Progress, and Impact on Productivity and Efficiency. *Journal of Development Studies 57*(6): 930–948. https://doi.org/10.1080/00220388.2020.1817393.

Ankrah, D., A., Freeman, C., J. & Afful, A., (2020). Gendered Access to Productive Resources – Evidence from Smallholder Farmers in Awutu Senya West District of Ghana. *Journal of Scientific African, 10*(2020):e00604.

Armbruster, S., Solomon, J., Blare, T., & Donovan, J., (2019). Women's Time Use and Participation in Cacao Value Chains: Evidence from VRAEM, Peru. *Development in Practice* 29(7):827-843. https://doi.org/10.10880/09614524.20191604630

Binge, A., Mshenga, P. & Kgosikoma, K., (2019). Production and Constraints of Smallstock Farming: Evidence from LIMID and Non-LIMID Farmers in Boteti Sub-District. *Journal of Agribusiness and Rural Development, 53*(3):195-201. http://dx.doi.org/10.17306/J.JARD.2019.01197.

Boshe, F., Terese, E., V., Vrahchiole, M., Khattri-Chettri, A., Saucer, A., (2021). *Measuring Women's Empowerment in Agricuture Index (WEAI) Under Climate Variability: A Microstudy from Nepal*. ICAE 2021 Conference Paper, p17-31. ICAE.

Botlhale, E., (2017). Women Economic Empowerment in Botswana: Success, Challenges and Propospects. *International Journal of Gender Studies in Developing Societie,s 2(*2):111-129.

Chaiya, C., Sikandar, S., Pinthong, P., Saqib, S. & Ali, N., (2023). The Impactof Formal Agricultural Credit on Farm Productivity and it Utilization in Kyber Pakhtunkhwa, Pakistan. *Sustainability* 15 (2023):1217. https://doi.org/10.3390/su15021217

Chhetri, R., Yokying, P., Smith, A., van den Hoek, J., Hurni, K., Saksena, S. & Fox, J., (2021). Forest, Agriculture, and Migration: Contemplating the Future of Forestry and Agriculture in the Middle-Hills of Nepal. *Journal of Peasant Studies, 50*(1):411-433 https://doi.org/10.1080/03066150.2021.1978983.

Christopherson, K., Yiadom, A., Johnson, J., Fernando, F. & Thiemann, C., (2022). *Tackling Legal Impediments to Women's Economic Empowerment*. Working Paper WP22/37. Washington D.C: IMF.

Combaz, E., & Mcloughlin, C., (2020). *Voice, Empowerment and Accountability.* Birmingham: GSDRC.

Cullen, S., (2021). *Women's Economic and Nutritional Empowerment: A Case Study of Gergera*

Watershed Project in Trigary Region in Ethopia. Ethiopia:ANH Academy, University College Cork.

Boshe, F., Terese, E., V., Vrahchiole, M., Khattri-Chettri, A., Saucer, A., (2021). *Measuring Women's Empowerment in Agricuture Index (WEAI) Under Climate Variability: A Microstudy from Nepal*. ICAE 2021 Conference Paper, p17-31. ICAE.

Danso-Abbeam, G., Ehiakpor, D. S. & Aidoo, R., (2018). Agricultural Extension and its Effects on Farm Productivity and Income: Insight from Northern Ghana. *Agriculture and Food Security, 7*(74). https://doi.org/10.1186/S40066-018-0225-X.

del Barrio, R., Fernandez, E., Brendel, A. S., Whitney, C., Campoy, J. A. & Luedeling, E., (2021). Climate Change Impacts on Agriculture's Southern Frontier – Perspectives for Farming in North Patagonia. *International Journal of Climatology, 41*(1):726–742. https://doi.org/10.1002/JOC.6649.

Diiro, G. M., Seymour, G., Kassie, M., Muricho, G. & Muriithi, B. W., (2018). Women's Empowerment in Agriculture and Agricultural Productivity: Evidence from Rural Maize Farmer Households in Western Kenya. *PLoS ONE 13*(5): e0197995. https://doi.org/10.1371/journal.pone.0197995.

FAO, (2019). FAO Framework on Rural Extreme Poverty: Towards Reaching Target 1.1 of Sustainable Development Goals. FAO, Rome.

Flor, A., (2021). Theories of Power and Social Change. Power Contenstations and Their Implications for Research on Social Cchange and Innovation. *Journal of Political Power, 14*(3)425-448. https://doi.org/10.1080/2158379X.2021.1875307.

Haug, R., Mwaseba, D. L., Njarui, D., Moeletsi, M., Magalasi, M., Mutimura, M., ... & Aamodt, J. T. (2021). Feminisation of African Agriculture and The Meaning of Decision-Making for Empowerment and Sustainability. *Sustainability*, *13*(16), 8993.

Kent, R., (2018). "Helping" Or "Appropriating"? Gender Relations in Shea Nut Production in Northern Ghana. *An International Journal of Society and Natural Resources*, *31*(3):367–381. https://doi.org/10.1080/08941920.2017.1382626.

Komatsu, H., Malapit, H., J., L. & Theis, S., (2018). Does Women's Time in Domestic Work and Agriculture Effect Women's and Children's Dietary Diversity? Evidence from Bangladesh, Nepal, Combodia, Ghana and Mozambique. *Food Policy, 79* (2018):256-270.

Lamm, K., W., Masambuka-Kanchewa, F., Lamm A., J., Davis, K., Nahdy, S., & Oyugi, M., A., (2021). A Case Study Analysis of Extension Service Provision in Malawi. *African Journal of Agricultural Research* 17(11):1386-1392.

LIMID Office, (2020). LIMID Report. MoA, Gaborone.

Mahofa, G., Sukume, C., & Mutyasira, V. (2022). Agricultural Commercialisation, Gender Relations and Women Empowerment in Smallholder Farm Households: Evidence from Zimbabwe. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/17372

Malapit, H. J., Sproule, K., Kovarik, C., Meinzen-Dick, R., Quisumbing, A., Ramzan, F., . . . Alkire, E., (2014). Measuring Progress Towards Empowerment: Women's Empowerment in Agriculture Index. Washington: IFPRI. https://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/128190/filename/128401.pdf

Mensah, J., (2019). Meaning, History, Principles, Pillars and Implications for Human Action: Literature Review. *Congent Social Sciences 5*(1)1653531. https://doi.org/10.1080/23311886.20191653531.

MoA, 2022. LIMID Programme Phase II Guidelines. Retrived from https://cms1.gov.bw/taxonomy/term/85?page=8

Muriel, J., Twyman, J., Useche, P., Lopera, D., C., Gonzalez, C. & Talsma, E., F., (2019). The Abbreviated Women's Empowerment Index (A-WEAI) Project Results for His and Hers , Time and Income-How Household Dynamics Impact Nutrition on Agricultural Households. International Center for for Tropical Agriculture. Colombia: CIAT. https://hdl.handle.net/10568/101141.

Must, E. & Harvoka, A. J., (2019). Co-Opting Cattle Spaces: Women, Cattle, and Empowerment in Northwestern Botswana. *Nature and Space, 2*(4), 922-943.

Myamba, F., (2020). Promoting Women's Economic Empowerment Through Social Protectio. Lessons from the Protection Savety Net Programme in Tanzania. Tanzania, UNICEF. https://www.unicef-irc.org/article/1950-empowering-women-through-social-protection.html.

Kering, N., (2019). Sustainable Solutions to Women's Economic Empowerment: Applying Agribusiness Incubation. Thesis, Diaconia University of Applied Sciences. Helsinki https://www.theseus.fi/bitstream/handle/10024/266792/Kering_Naomy.pdf?sequence=2&isAllowed=y

Obayelu, O. A. & Chime, A. C., (2020). Dimensions and Drivers of Women's Empowerment in Rural Nigeria. *International Journal of Social Economics, 47* (3): 1-19.

OECD, 2021. *Gender and the Environment: Building Evidence and Policies to Achieve Sustainable Development Goals*. OECD, Paris. https://doi.org/10.1787/3d32ca39-en.

Onori, F., Dhillon, P., Dinachandra, K., Jaleel, A., Saraswat, A., R.S., R., Unisa, S., & Sethi, V., (2021). An Adaptation of the Food Insecurity Experience Scale (FIES) for Measuring Food Insecurity Among Women in Socially- Backward Communities. *Asian Journal of Agriculture and Development*, *18*(1), 66–82. https://doi.org/10.37801/ajad2021.18.1.5.

Othman, M., Garrod, G.& Oughton, E., (2021). Farming Groups and Empowerment of Women Smallholder Farmers. *Development in Practice, 31* (5):676-689.

Patridge-Hicks, S., (2020). *Defeat Poverty-Five Countries Where Women Play Vital Role in Agriculture.* France: Global Citizen. https://globalcitizen.org/en/content/women-agriculture-around-the-world.

Peralta, A., (2022). The Role of Men and Women in Agriculture and Agricultural Decisions in Vanuatu. *Asia and the Pacific Policy Studies*, *9*(1)59-80.

Petrulla, N., (2021, February 01). *Income Alone is Not Enough: The Importance of Increasing Women's Decision-Making in Agriculture*. Washington D. C.:Feed the Future. https://agrilinks.org/post/income-alone-not-enough-importance-increasing-womens-decision-making-agriculture.

Purvis, B, Mao, Y & Robinson, D, (2019). Three Pillars of Sustainability in Search of Conceptual Origins. *Sustainable Science 14*(2019)681-695.

Quisumbing, A., Hecket, J., Faas, S., Ramani, G., Raghunathan, K., Malapit, H., (2021). Women's Empowerment and Gender EqualityValue Chains: Evidence from Four Countries in Asia and Africa. *Food Security, 13*(2021):1101-1124.

Quisumbing, A., Meinzen-Dick, R., & Malapit, H. (2022). Women's Empowerment and Gender Equality in South Asian Agriculture: Measuring Progress Using the Project-Level Women's Empowerment in Agriculture Index (pro-WEAI) in Bangladesh and India. *World Development*, *151*:105396. https://doi.org/10.1016/j.worlddev.2021.105396.

Ragasa, C., Malapit, H. J., Rubin, D., Myers, E., Pereira, A., Martinez, E. M., ... & Mswelo, G. (2021). *" It Takes Two": Women's Empowerment in Agricultural Value Chains in Malawi* IFPRI Discussion Paper 02006. Washington D. C.: IFPRI. https://doi.org/10.2499/p15738coll2.134302.

Shahbaz, P., ul Haq, S., Abbas, A., Batool, Z., Alotaibi, B. A. & Nayak, R, K., (2022). Adoption of Climate Smart Agricultural Practices Through Women Involvement in Decision Making Process: Exploring the Role of Empowerment and Innovativeness. *Agriculture* 12(2022). https://doi.org/10.3390/agriculture/2081161.

Shakil, M., (2021). Environmental, Social and Governance Performance and Financial Risk: Moderating Role of ESG Controversies and Board Gender Diversity. *Resources Policy, 72* (2021):102144. https://doi.org/10.1016/j.resourcepo/2021/102144.

Sharma, D., Chaudhary, R. & Kumar, K., (2020). Women Empowerment in Agriculture and its Dimensions: A Conceptual Review. *International Journal of Economic Plants*, *7*(3), 111–114. https://doi.org/10.23910/2/2020.0371.

Singh, K., M., Kumari P. & Ahmad, N., (2019). *An Analysis of Women's Participation in Agriculture in Bihar.* MPRA Paper No. 98067. India, PUSA.

Tabassum, M, Begun, N., Rana, M., S., Faruk, M., O., & Miah, M., M., (2019). Factors Influencing Women Empowerment in Bangladesh. *Science Technology and Public Policy 3*(2):1-7.

Udemezue J., C. & Odia F., N., (2021). Gender Disparities and Roles of Women in Agriculture in the South Eastern Nigeria. *Biomedical Journal of Scientific and Technical Research Network, 36*(4) 28788-28792.

USAID, 2021. *Women Empowered for Leadership and Development, Sierra Leone*. 2019 WELD Final Performance Evaluation Report. Sierra Leone, USAID.

Waite, S., R., (2021). Towards the Theory Critical Consciousness: A New Direction for the Development of Instructional and Supervisory Leaders. *Journal of Educational Supervision*, *4*(2)65-74.

WOCAN. (2016, August 13). WOCAN's Theory of Change. WOCAN, Hawaii. https://www.wocan.org/resources/wocans-theory-change

Williams, E., (2022). Women's Economic Improvement in Sub-Saharan Africa: What Do We Know? NIUSSP, Fierenze. https://www.niussp.org/education-work-economy/women's-economic-empowerment-in-sub-saharan-Africa

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