

Chapter 2

Determinants of Women's Empowerment in Agriculture in Botswana: The Abbreviated Women's Empowerment in Agriculture Index (A-WEAI) Approach

Masa V. Motaung^a and Martin Bosompem^b

^aBotswana University of Agriculture and Natural Resources, Botswana

^bUniversity of Cape Coast, Ghana

Abstract

Women's empowerment is recognised as a crucial strategy for the development of societies globally, particularly in agricultural sectors where empowering women can significantly contribute to poverty reduction. This study aimed to diagnose the status of the women empowerment and evaluate the influence of the small-stock package of the Livestock Management and Infrastructure Development (LIMID) programme on women's empowerment in the Central District of Botswana. A concurrent mixed-methods design was employed, collecting data from 370 women. The study utilised the Abbreviated Women's Empowerment in Agriculture Index (A-WEAI) to measure empowerment as dependent variable. The regression analysis revealed farming settlement, household type, animal feeding regimes and the observability of the programme's benefits were predictors of women empowerment in agriculture. The study recommends the adoption of a pluralistic extension system and the integration of gender-transformative approaches by the Ministry of Agriculture to enhance the impact of such programmes and enhance the level of women empowerment in agriculture.

The Emerald Handbook of Family and Social Change in the Global South, 39–55



© 2026 Masa V. Motaung and Martin Bosompem.

Published by Emerald Publishing Limited. This work is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this work (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licences/by/4.0/legalcode>
doi:[10.1108/978-1-83549-802-620261003](https://doi.org/10.1108/978-1-83549-802-620261003)

Keywords: Women's empowerment; household dynamics; abbreviated women's empowerment in agriculture approach; agriculture; Botswana

Introduction

Women's empowerment is a critical strategy for fostering development globally, particularly in the agricultural sector, where women often face gender inequalities. [World Bank \(2020\)](#) report a minimal fall in extreme poverty from 33% in 1990 to 10% in 2015. Despite this progress, Sub-Saharan Africa remains disproportionately affected, with 16.1% of Botswana population living in extreme poverty, particularly women ([World Bank, 2020](#)). Rural communities in developing nations often exhibit pronounced gender disparities, with men enjoying economic, social and political privileges than women ([UNDP, 2013](#)). These inequalities exacerbate poverty among women, prompting a global call for interventions aimed at empowering women, particularly in the agricultural sector.

In response to this global call, Botswana has initiated several interventions to promote women's empowerment and poverty alleviation, notably through collaboration with Non-Governmental Organisations (NGOs), Community-Based Organisations (CBOs) and women's groups. These initiatives, supported by government funding, aim to empower women in entrepreneurship, reduction of poverty, education, food security, health and leadership ([Government of Botswana, 2015, 2019](#)). One such intervention is the Livestock Improvement and Infrastructure Development (LIMID) programme, launched in 2007 in the Ministry of Agriculture. LIMID's aim is to improve food security and poverty eradication. This programme prioritises women and youth, particularly through its small-stock package, offering support to eradicate poverty ([Moreki et al., 2010](#)).

The LIMID programme's small-stock package falls under the 'resource-poor' component, providing with a grant worth 220 USD from which the ministry facilitates the purchase of a herd stock. The herd size varied from 30 to 18 since prices changed over time. Additionally, the veterinary requisites and one week's training on small stock were to be provided by extension agents ([Ministry of Agriculture, 2010](#)). The small stock package was in high demand in the Central district, with more than 20,000 from which approximately 9,000 were women. However, few empirical studies have comprehensively assessed the programme's impact on women's empowerment in agriculture and poverty eradication. [Moreki et al. \(2010\)](#) evaluated the adoption of LIMID's packages across gender lines but failed to explore how the programme empowered its female users. Although the LIMID programme intended to eradicate poverty, it is important to diagnose the empowerment status of women in order to allow for adjustments and improvements as a strategy to achieve poverty eradication goals. Empowerment status can be influenced by the implementation of the general programme and household dynamics of the beneficiaries ([Alkire et al., 2013](#)).

Various scholars have employed different approaches to assess women's empowerment within agricultural contexts. For instance, [Doss et al. \(2018\)](#) used the asset ownership and control while [Kabeer \(2005\)](#) used the access to credit and financial resources. [Sharma and Varma \(2016\)](#) focused on women's participation in agricultural cooperatives and networks, and [Agarwal \(1994\)](#) emphasised policy and legal frameworks. However, these approaches often concentrate on specific sections of the agricultural value chain and do not holistically track gender-based progress.

To evaluate the effect of LIMID programme's influence on women's empowerment status in agriculture, this study employed the Abbreviated Women's Empowerment in Agriculture Index (A-WEAI). The A-WEAI is a sector-specific tool designed to measure empowerment through five domains: decision-making in agricultural activities, decision-making in household income and resource ownership, participation in groups and time-use/workload. The study in evaluating the LIMID small-stock programme vis-à-vis women's empowerment in agriculture proposed the following specific objectives:

- (1) Examine the household dynamics, management practices of women.
- (2) Investigate the status of women's empowerment in agriculture of the LIMID programme.
- (3) Explore the relationships between household dynamics, perceived effectiveness of the programme, perceived attributes and women's empowerment in agriculture.
- (4) Examine factors that best predict women's empowerment in agriculture of the LIMID programme.

Theoretical Framework

Three main theories that underpin this study were as follows:

Theory of Agency 'power': [Kabeer \(2005\)](#) defines empowerment as a process enabling individuals previously restricted from making strategic life choices to gain the capacity to do so, encompassing agency (the ability to act), resources and achievements. This shift from disempowerment to empowerment allows individuals to make impactful decisions. [Rowlands \(1995\)](#) further categorises power into 'power to' (exercising agency for self or others), 'power over' (controlling actions/resources) and 'power with' (collective collaboration), emphasising both personal and collective power within close relationships and household decision-making. The concept of agency aligns with the A-WEAI (Women's Empowerment in Agriculture Index), which measures decision-making, access to resources and mobility. However, A-WEAI has faced criticism for being context-specific and not fully capturing intra-household decision dynamics or women's perspectives.

Theory of Critical Consciousness: Freire (1996) asserts that critical consciousness awareness of social and cultural influences is essential for empowerment, combining with agency and resource access to drive the empowerment process. This view aligns with Rowlands (1995), who highlights how household power dynamics can create inequalities. Asghar et al. (2013) further support this by noting that household characteristics, such as demographics, employment and lifestyle, significantly affect women's empowerment. In this study, the theory of critical consciousness is used to examine how socio-demographic and household factors influence women's empowerment, particularly in agricultural contexts, enabling a detailed understanding of the supportive or obstructive elements in empowerment processes.

Implementation Theory: Implementation theory also emphasises on the execution of the programme's activities relative to planned activities. The theory expresses 'the essence of how programme activities are presumed to affect the mechanisms of change identified when initiating the programme, that is, the process of implementation' (Scheirer, 1987, p. 40). In this study, the theory was applied to measure the views on how they judge the implementation of the LIMID small-stock components as outlined in the guidelines based on their experience. The implementation of the LIMID programme determines the effectiveness of the programme, which directly has a relationship with the empowerment status.

Women's Household Dynamics: In this sub-section, the literature focused on socio-demographics and household composition since they form household dynamics of women. The section is based on the theory of 'Critical Consciousness' by Freire (1996), which was further elaborated by Asghar et al. (2013). The main reason is that the household dynamics of the women affect women empowerment and hence the importance of looking into them.

Related Literature Review

In this section, we focused on relevant topics that informed the objectives and the conceptual framework of the study.

Implementation of Agricultural Programmes and the LIMID Programme

The success of agricultural programmes relies on effective implementation, adherence to plans and budgeting. Poor follow-through on planned activities often leads to unmet goals, as seen in Uganda, where inadequate execution contributed to programme failure (Ministry of Finance, Planning and Economic Development, 2015), and in Nigeria, where strong initial planning did not prevent failures in later stages (Matthew & Olatunji, 2016). In contrast, South

Africa's consistent monitoring of livestock programmes has yielded positive outcomes (Moerane, 2018). Transparency and accountability are crucial to prevent beneficiary exploitation (Harb & Leland, 2018) while participatory evaluation methods allow necessary adjustments to meet beneficiary needs (Jay-Hyung et al., 2020). The LIMID programme, launched in Botswana in 2007, seeks to boost food security, livestock productivity and poverty reduction. Its goals include improved management of small-stock, better use of range resources and safer poultry processing infrastructure. Designed to aid resource-poor farmers with low income or limited livestock, LIMID provides with small-stock packages, veterinary kits and extension support. Extension agents conduct monthly project monitoring, while manage their herds, which remain government property for five years, with restrictions on selling or slaughtering livestock for the first three years.

Perceived Attributes of an Innovation

According to Rogers (1983), people evaluate innovations based on five perceived attributes: relative advantage, compatibility, complexity, trialability and observability while Ramayah (2010) adds voluntariness as a sixth attribute. Research shows that positive perceptions of an innovation or programme often led to its successful adoption (Jayashankar et al., 2018). From an empowerment perspective, positive views can enhance motivation among end users, which Sibota (2010) links to empowerment. Motivation is seen as a critical initial stage of empowerment, fostering self-awareness among the programme's target users.

Women's Empowerment in Agriculture and Its Measurement

In agriculture, empowerment involves the ability to make decisions regarding agricultural practices and access essential resources (Alkire et al., 2013). In Sub-Saharan Africa, women constitute a significant portion of the agricultural workforce, dedicating about 60% of their time to farming (Brenton et al., 2011; Njobe & Kaaria, 2015). However, gender disparities in resource access and decision-making remain prevalent. While organisations advocate for gender parity in agricultural sustainability, women's empowerment is still insufficiently addressed (Montpellier Panel, 2013). In South Africa, women's empowerment in agriculture is linked to improved food availability and household nutrition (Makhubele et al., 2021), yet capacity-building efforts are inadequate. Barriers such as limited market access, credit and business skills impede women's income generation (Botlhale, 2017). In Botswana, social values and gender role myths further restrict women's participation in agriculture (Must and Hovorka, 2019). The Women's Empowerment in Agriculture Index (WEAI) serves as a tool to measure women's empowerment, agency, and gender inclusion in agriculture. The WEAI is based on individual-level data from household surveys, evaluating

both men and women using the Alkire-Foster method for multidimensional poverty. It comprises two sub-indices: one measuring women's empowerment across five domains (Five Domains of Empowerment [5DE]) – decision-making over agricultural activities, access to and control over productive resources, control over income use, community leadership and time allocation – and the other evaluating gender parity within households. These domains help identify areas for enhancing empowerment and track improvements over time.

Conceptual Framework of the Determinants of Women's Empowerment in Agriculture

The conceptual framework (Fig. 2.1) outlines the interactions between household dynamics, programme implementation, perceptions and socioeconomic benefits on women's empowerment within the LIMID programme. The general implications are that, based on the theory of implementation, if a LIMID programme is well implemented using appropriate measures, it would increase small stock production, which may shift the women's power over their lives as emphasised by the theory of power. The theory of critical consciousness considers the social dynamics in households that determines the agency and power of women over their lives and accessibility of resources important in small-stock production. Literature also shows that perceived attributes influence the effectiveness of the implementation and adoption of the programme or innovation (Rodgers, 1983).

Methodology

The study was conducted in the Central District of Botswana. A concurrent mixed-methods research design was employed, blending both qualitative (focus group interviews) and quantitative approaches (survey) to gather comprehensive data (Plano Clark, 2017; Wisdom & Cresswell, 2013).

This study used a complex multistage sampling technique to randomly select four districts (clusters) from a list of seven districts: Mahalapye, Boteti, Tutume and Palapye. Thereafter, the beneficiaries from the selected clusters were selected using simple random sampling. In total, the study required 370 female participants for the survey.

The dependent variable was women's empowerment, A-WEAI. The index consists of 5DE.

Descriptive statistics were used to summarise the data while linear regression analysis was used to identify the key determinants of women's empowerment in agriculture such as *socio-demographics characteristics* and *household dynamics*. The focus group interviews were analysed using thematic analysis with 48 female participants.

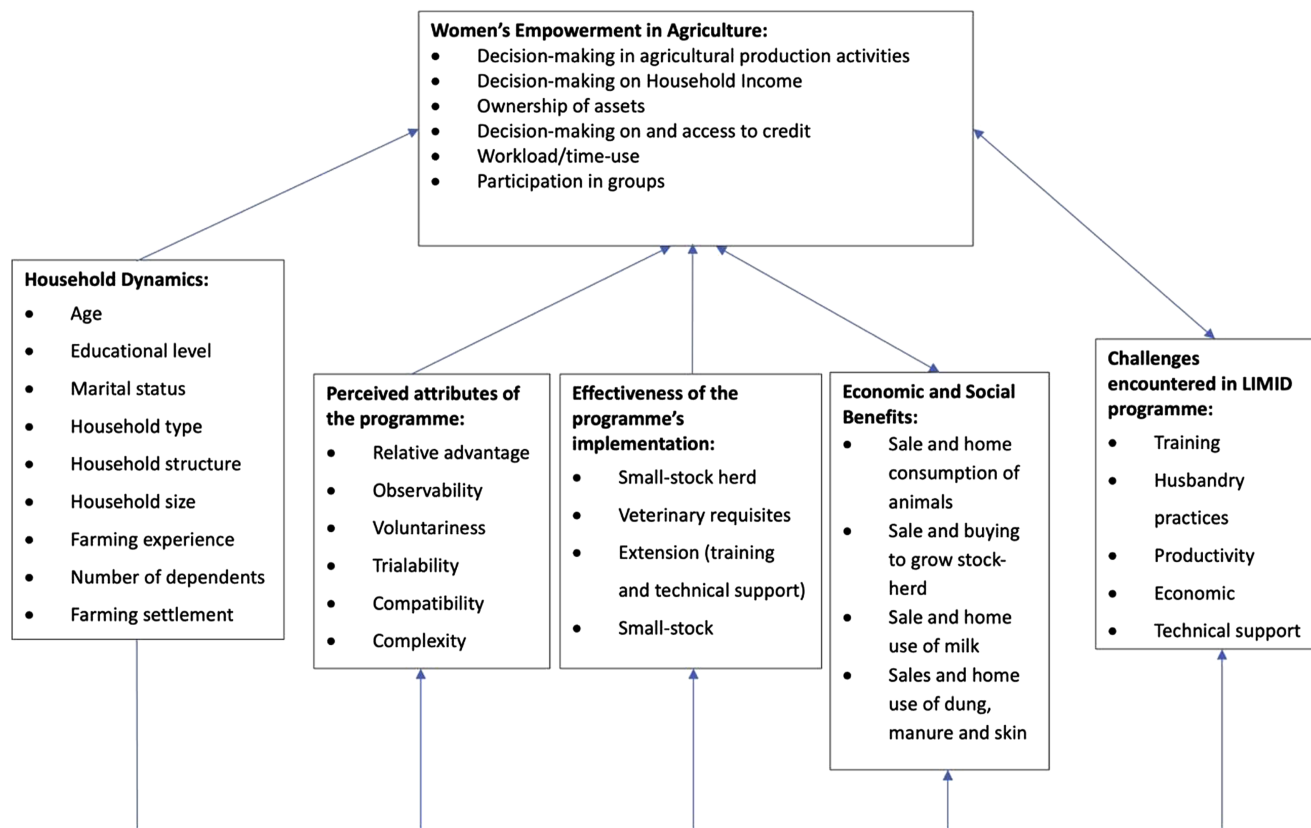


Fig. 2.1. Conceptual Framework of the Effect of the LIMID Programme on Women's Empowerment in Central Botswana. *Source:* Authors' Construct (2021).

Results and Discussions

Socio-Demographic Characteristics, Household Dynamics and Farming Practices

Majority (84.9%) were adults aged 25–64 while 15% were elders aged 65 and above. Also, the majority of the women (60.50%) were single, 20% were married while the rest were either widowed (13.00%), cohabiting (4.90%) or divorced (1.60%). Also, the majority (78.10%) had pre-tertiary education from primary to senior secondary level.

In terms of employment status, six out of every 10 were not officially employed with any agency. The mean years of experience in small stock farming were 4.71 ± 2.46 . About 66% and 31.6% had 1–5 years and 6–10 years of small stock farming experience.

Majority of the respondents (65.1%) were from female-headed households. This suggests that most participants belong to a relatively more disadvantaged demographic group compared to other groups within the country.

Female-headed households in Botswana often face distinct challenges, particularly in agricultural production (Lesetedi, 2018). This situation places LIMID at a potential disadvantage, as women in such households typically encounter more difficulties in managing agricultural activities effectively (Marenja et al., 2015).

During the focus group discussions, beneficiaries reported living with extended family members, including parents, nieces, nephews and uncles, due to a lack of adequate housing. Some participants mentioned owning residential plots but having not yet constructed homes. This situation has resulted in larger household sizes with insufficient accommodation and food resources. One middle-aged woman in Boteti sub-district explained that:

Most of us here were allocated residential plots four years ago but could not develop them because of lack of funds. That is the main reason we are still staying with our parents together with our siblings and children.

Additionally, women indicated that the large number of dependants, predominantly youth, does not necessarily support effective small-stock production, as the younger family members are often less involved in or capable of managing agricultural tasks. For instance, during the focus group discussions, one beneficiary narrated that:

Most of us in this community are literally household caretakers since we lost our parents and some of our siblings. We take care of our children and these orphans. We are heads of our households, so we solely make decisions on how best to use resources more especially agricultural land use.

These findings highlight the complex interplay between household dynamics, economic challenges and agricultural productivity. Extended family systems, while providing social support, can also impose additional burdens on women, particularly in agricultural contexts where efficient resource management is crucial (Marenya et al., 2015; Ramabu, 2020).

Most of the participants (77.00%) practise village farming while the rest are either keeping their small stock at the arable land settlements (18.00%) or the cattle posts (5.00%). Also, 287 (77.57%) stay with their animals.

In Botswana, there are three known rural settlements namely, villages, arable lands and cattle posts (Magole & Kgomo, 2018) with the most preferred being the cattle posts for livestock farming. During the focus group discussion, a beneficiary from Palapye explained that:

Indeed, cattle posts are the best for small-stock farming, but we prefer village settlement because of social obligations such as taking care of school children and opportunities to get casual jobs which one could not get at the cattle post.

A beneficiary among them added that:

We are aware that it is advantageous to rear livestock at the cattle post because there is an abundance of grazing range and many natural water sources as compared to the village and arable farming settlements.

This finding reflects broader socio-economic dynamics in rural communities where livelihood decisions are often influenced by family responsibilities and the need for supplemental income. Village settlements offer women greater opportunities to meet these needs despite the agricultural advantages of cattle posts.

Despite large household sizes, most do not receive household help, as animal ownership is primarily the women's responsibility. This was further stressed during the focus group discussions as a beneficiary at Tutume indicated that:

We struggle with labour to take care of the stock herd, despite our large family sizes. Our household members refuse to help us to take care of the animals.

Women's Empowerment in Agriculture

Table 2.1 presents the women's empowerment scores across various domains within the agricultural sector.

The overall empowerment score (0.79) reflects cumulative progress (i.e. nearly satisfactory empowerment) across these domains, but given the low individual scores in critical areas like control over income and access to resources, the

Table 2.1. Women’s Empowerment in Agriculture.

Domain	Mean
Decisions over agricultural production	0.19
Control over use of income	0.20
Access to and decision-making power over productive resources	0.14
Time-use	0.09
Leadership	0.17
Overall	0.79

overall figure may still indicate that significant challenges remain. Economic empowerment through income control, improved access to resources and time management are interconnected and critical to sustainable empowerment outcomes.

Firstly, decisions over agricultural production (Mean = 0.19) evaluates the extent to which women are involved in making decisions about agricultural production. The low mean score (0.19) indicates that women in the LIMID programme have limited decision-making power over agricultural production. This highlights the historical marginalisation of women in agriculture across Sub-Saharan Africa, where decision-making often remains male-dominated, even in households where women contribute significantly to production activities (Doss, 2018). Strengthening women’s participation in decision-making is crucial for their empowerment, as control over production decisions directly affects their ability to influence the outcomes of agricultural interventions.

Control over income (Mean = 0.20), reflects women have limited control over the income generated from agricultural activities. Economic empowerment is pivotal to overall empowerment, as control over income is closely linked to improved household bargaining power, agency and decision-making capacity (Kabeer, 2005). In many cases, women’s lack of financial autonomy limits their ability to invest in further agricultural inputs or contribute to household welfare effectively, as seen in similar contexts.

Access to resources (Mean = 0.14) such as land, livestock and inputs is essential for agricultural productivity and sustainability. This domain shows that women in the LIMID programme have restricted access and decision-making power over these critical resources. Literature consistently shows that women’s access to land and other productive assets in Sub-Saharan Africa is highly constrained due to legal, cultural and institutional barriers (FAO, 2015). Enhancing women’s access to and control over productive resources is essential for achieving agricultural productivity and empowerment outcomes.

Furthermore, time-use is a key aspect of empowerment, reflecting the ability to allocate time between productive and reproductive responsibilities. The extremely low score in this domain (Mean = 0.09) suggests that women

participating in LIMID face significant time constraints, likely due to their dual responsibilities in domestic and agricultural work. This resonates with findings by Oxfam (2017), which highlight that women's unpaid care work limits their ability to engage in income-generating activities and participate fully in agricultural decision-making.

Lastly, leadership reflects women's participation in community groups and their influence within those spaces. The mean score (0.17) indicates low involvement in leadership roles, which could limit women's capacity to advocate for their needs and influence community-level decisions. Women's participation in collective action and leadership roles is essential for asserting their rights and gaining access to resources. This limited engagement could stem from socio-cultural norms that marginalise women in public decision-making, which is a common barrier across many African contexts.

Correlates of Women's Empowerment in Agriculture with Household Dynamics, Implementation of the Programme and Perceived Attributes of the Programme

Being married is associated with lower empowerment compared to women in other marital categories ($r_{bi} = -0.229^{**}$). Suggesting that married women have less autonomy in decision-making due to shared responsibilities with spouses. Women in dual households are less empowered than those in woman-only households ($r_{bi} = -0.227^{**}$). This may be because women in dual households share control over resources and decision-making whereas women in woman-only households have more autonomy.

Women who farm in village settlements are significantly less empowered ($r_{bi} = -0.641^{**}$) than those in other types of farming settlements (e.g., cattle posts or arable land). The associations reflect the challenges village women face, such as limited access to grazing lands, water and other productive resources due to household dynamics.

Again, animal health shows a positive Pearson correlation ($r = 0.107^{*}$), indicating that better animal health is associated with higher empowerment. This suggests that managing animal health effectively contributes to increased productivity and empowerment in agriculture, as healthy livestock is key to small-stock production success.

Additionally, ease of use of the LIMID programme has a positive correlation ($r = 0.127^{*}$), implying that women who find the programme easier feel more empowered. Simplifying the programme's processes could therefore enhance women's participation and overall empowerment. The study results support the theory of women's empowerment (WOCAN, 2016), which states that relevant stakeholders of women's empowerment programme must provide capacity building for the development programme to be a success. Women who perceive the programme as something they can experiment with are more empowered ($r = 0.129^{*}$). This emphasises the importance of flexibility and adaptability in agricultural programmes to boost women's engagement. When

women feel that participation in programmes is voluntary and self-driven, they are more empowered ($r = 0.153^*$). In other words indicate that women taking decisions on their own accord promotes positive acceptance of the programmes and hence devotion to making it work because they are not forced into it.

Determinants of Women’s Empowerment in Agriculture

Fig. 2.2 presents a linear regression of the determinants of women’s empowerment in agriculture accounting for the most important predictors based on a stepwise approach. The results show that only four (4) significantly predicted women’s empowerment in agriculture namely farming settlement, household type, animal feeding and perceived observability of the programme.

These four predictors accounted for a total of 45.9% of the variance in women’s empowerment. Farming settlement was the overall best predictor, contributing 40.90% to the 45.90% variance of women’s empowerment followed by household type (3.50%), feeding (0.90%) and observability (0.60%).

Farming settlement has shown to be the best predictor of women’s empowerment in agriculture. The results indicate that women who farm in the village are less empowered in agriculture than those in arable land and cattle post. This confirms that the type of farming settlement affects women’s empowerment.

Despite this, the beneficiaries explained that they are obliged to farm in the village because they have a lot of responsibilities in the village such as taking care of the school children and opportunities of getting casual work among others. As a result, the beneficiaries’ stock-herds do not increase in size because they are exposed to death when they trespass; thieves since they are not herded all day due to inadequate labour; poor feeding and limited water intake. All these challenges limit women from economically benefiting from small-stock production.

Women’s household type (1 = Dual, 0 = Woman only) was the second-best predictor of women’s empowerment in agriculture, contributing 3.50% of the 45.90% of the variance. The negative association (-0.060) shows that women belonging to woman only household are more empowered than those from dual

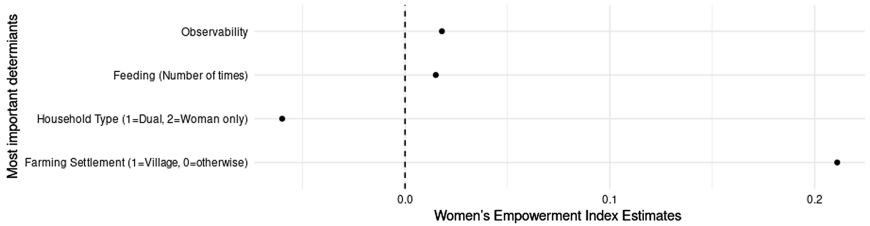


Fig. 2.2. Most Important Determinants (y-Axis) of Women’s Empowerment Index (x-Axis) Based Linear Regression Estimates Using a Stepwise Model Selection. Reference Line a Zero for No Association.

households. This suggests that household type has an effect on women's empowerment, which is influenced by the intra-household decision-making of other members. This confirms the theory of consciousness described by Freire (1996) that household dynamics affect women's empowerment.

The third best predictor of women's empowerment was animal feeding. This is understandable because animal feeding is one of the management practices that form the basis of health and reproduction hence determining the outputs of livestock production.

Farmers need to know what and when to provide feed supplements to correct any deficiency, hence promoting good health and production (Spencer, 2018). In this manner, the women need extension guidance in feeding their animals to promote high production since it is not easy to manage animal feeding in free range (Baleseng et al., 2016). Agricultural extension which provides capacity building is important in women's empowerment and should be applied strategically since women face stumbling blocks to access it due to cultural practices as is the case in Ghana (Omondi et al., 2022). This may lead to poor production and eventually low empowerment from livestock production (Bonye et al., 2012).

The last best predictor of women's empowerment in agriculture is the perceived observability of the LIMID programme. Logically, women having a positive perception of the LIMID programme being doable gives hope of achieving its mandate of empowering them and hence would take it up. Therefore, the extension agents should use method and result demonstration when teaching farmers in order for the beneficiaries to appreciate the whole production process and the end results (Adiyoga, 2021). This is a way of triggering motivation on women and encouragement to do more in their small-stock production as was the case with ornamental farmers in Florida (Warner et al., 2019).

Conclusions and Recommendations

The study concludes that the LIMID programme in Botswana's Central District is primarily utilised by adults, with limited participation from youth. Most belong to dual households and engage in village farming, which has contributed to inadequate implementation of the programme due to deviations from established guidelines. Challenges related to extension services and small-stock production were identified, stemming from blueprint management and insufficient support from extension agents. Although the programme is seen as trailable, observable and advantageous, it was perceived as complex and not fully compatible with the daily lives of women. While women's empowerment under the A-WEAI (Women's Empowerment in Agriculture Index) was nearly satisfactory, further improvements are needed to exceed the empowerment threshold. The results have shown that beneficiaries have control over household income, agricultural production, resources and group involvement. Women's empowerment was significantly influenced by household dynamics (such as household type, marital status and farming settlement), small-stock management (including animal health) and perceived attributes of the programme (like ease of

use and trialability). Overall, empowerment was found to depend largely on household settlement and dynamics, followed by small-stock management and programme observability.

The study recommends that women form or join agricultural groups to enhance production, access extension services and improve market opportunities. It suggests that the Ministry of Agriculture adopt participatory and pluralistic extension approaches. Rational resource allocation is also essential. To ease women's household burdens, the introduction of gender-transformative approaches, such as labour-saving technologies, is encouraged. Integrated farming also must be introduced to women to farm in their compatible and preferred farming settlement, that is arable lands, hence diversifying income generation, saving time and reducing workload which is disempowering them. Additionally, improving rural infrastructure, particularly roads, will enhance market access and attract investors.

Government policies should prioritise targeted support for female-headed households, including increased access to resources, training and support services tailored specifically for women to help bridge the empowerment gap linked to single-gender households. The study emphasises the need for increased opportunities to observe successful implementation of programme components, such as improved livestock management and production techniques, through on-farm demonstrations, success story showcases and peer visits. Additionally, the extension service should promote greater harmony and shared decision-making between couples and household members. The Ministry of Agriculture should customise extension services to meet the unique needs of various farming settlements, addressing local challenges and enhancing access to knowledge and resources.

Acknowledgement

The authors acknowledge with appreciation the grant support of the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) for this research.

References

- Adiyoga, W. (2021). Innovation attributes and their linkages to behavioral drivers of farmers' intention to adopt true shallot seed. In *2nd international conference on agribusiness and rural development (IConARD 2021)*. EDP Sciences.
- Agarwal, B. (1994). Gender and command over property: A critical gap in economic analysis and policy in South Asia. *World Development*, 22(10), 1455–1478.
- Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A., Seymour, G., & Vaz, A. (2013). The women's empowerment in agriculture index. *World Development*, 5(2), 71–91.

- Asghar, N., Jaffri, A. A., & Asjed, R. (2013). An empirical investigation of domestic and external determinants of inflation in Pakistan. *Pakistan Economic and Social Review*, 30(2), 55–70.
- Baleseng, L., Kgosikoma, O., Coleman, M., Baker, D., Temoso, O., Morley, P., & Bahta, S. (2016). Performance of goats and sheep under communal grazing in Botswana using various growth measures. In *The seventh international conference on agricultural statistics (ICAS VII)*. ICAS.
- Bonye, S. Z., Alfred, K. B., & Jasaw, G. S. (2012). Promoting community-based extension agents as an alternative approach to formal agricultural extension service delivery in Northern Ghana. *Asian Journal Agricultural Rural Development*, 2(1), 76–95.
- Botswana Government. (2019, June 15). *BW Gov*. <https://www.gov.bw/subsidies/financial-support-women-policy-guidelines>
- Botlhale, E. (2017). Women economic empowerment in Botswana: Success, challenges and prospects. *International Journal of Gender Studies in Developing Societies*, 2(2), 111–129.
- Brenton, P., Bucekuderhwa, C. B., Hossein, C., Nagaki, S., & Ntagoma, J. B. (2011). *Risky business: Poor women cross-border traders in the cross-border traders in Addis Ababa, Ethiopia: Africa Trade Policy*.
- Doss, C. R. (2018). Women and agricultural productivity: Reframing the issues. *Development Policy Review*, 36(1), 35–50.
- FAO. (2015). *Empowering rural women, powering agriculture*. FAO.
- Freire, P. (1996). *Education for critical consciousness*. Continuum.
- Government of Botswana. (2015). *Small-stock management practices*. Government of Botswana.
- Government of Botswana. (2019). *Small-stock management practices*. Government of Botswana.
- Harb, S., & Leland, R. J. (2018). Exploiting disadvantage as causing harm. *Ethics and Global Politics*, 12(1), 33–42.
- Jay-Hyung, K., Jonas, S. F., & Simon, G. (2020). *Project implementation, monitoring and evaluation*. World Bank Group.
- Jayashankar, P., Nilakanta, S., Johnston, W. F., Gill, P., & Bures, R. (2018). IoT adoption in agriculture: The role of trust, perceived value and risk. *Journal of Business & Industrial Marketing*, 1(33), 804–821.
- Kabeer, N. (2005). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*, 30(1999), 435–464.
- Lesetedi, G. N. (2018). A theoretical perspective on women and poverty in Botswana. *Journal of International Women's Studies*, 19(5), 192–208.
- Magole, L., & Kgomotso, P. K. (2018). Evolution or illusion? The Okovango Delta management process versus the conventional planning system in the face of climate change and variability in Botswana. In L. A. Swatuk & C. Cash (Eds.), *Water, energy, food and people across the global south: 'The Nexus' in the era of climate change*. Palgrave Macmillan.
- Makhubele, L., Tshidzumba, R. P., & Chirwa, P. W. (2021). What are the alternative options for diversifying land use under forestry land restitution: The case of Limpopo Province forestry land restitution, South Africa. *Journal of Sustainable Forestry*, 40(8), 802–819.

- Marennya, P., Kassie, M., Jalet, M., & Rahut, D. (2015). Does gender of the household head explain smallholder farmers' maize market positions? Evidence from Ethiopia. *Agriculture in an Interconnected World*, 34(2), 1–20.
- Matthew, A. O., & Olatunji, O. M. (2016). Policy issues for improving monitoring and evaluation of agricultural extension programmes in Nigeria. *African Evaluation Journal*, 4(1), a122.
- Ministry of Agriculture. (2010). *Agricultural planning and statistics: Gender and agriculture*. Ministry of Agriculture.
- Ministry of Finance, Planning and Economic Development. (2015). *Ineffective implementation of agricultural projects/programs: What are the persistent causes?* BMAU.
- Moerane, E. M. (2018). *Constructing a psycho-social model for team cohesion at a financial institution*. Doctoral Dissertation. University of Pretoria.
- Montpellier Panel. (2013). *Sustainable intensification: A new paradigm for African agriculture*. Imperial College London.
- Moreki, J. C., Mokokwe, J., Keboneilwe, D., & Koloka, O. (2010). Evaluation of the livestock management and infrastructure development support scheme in seven districts of Botswana. *Livestock Research for Rural Development*, 22(5), 78–87.
- Must, E., & Harvok, A. J. (2019). Co-Opting cattle spaces: Women, cattle, and empowerment in Northwestern Botswana. *Nature and Space*, 2(4), 922–943.
- Njobe, B., & Kaaria, S. (2015). *Women and agriculture: The untapped opportunity in the wave of transformation* [Background Paper]. References-Scientific Research Publishing.
- Omondi, I., Galiè, A., Teufel, N., Loriba, A., Kariuki, E., & Baltenweck, I. (2022). Women's empowerment and livestock vaccination: Evidence from peste des petits ruminants vaccination interventions in Northern Ghana. *Animals*, 12(2022), 7–17.
- Oxfam. (2017). *The Nepal earthquake six months on: What needs to happen now?* Oxfam.
- Plano Clark, V. L. (2017). Mixed methods research. *The Journal of Positive Psychology*, 12(3), 305–306.
- Ramabu, N. M. (2020). Botswana children's needs: Orphans and vulnerable children dominated child welfare system. *Heliyon*, 6(2020), 3801–3810.
- Ramayah, T. (2010). The role of voluntariness in distance education students' usage of a course website. *TOJET - Turkish Online Journal of Educational Technology*, 9(3), 96–105.
- Rogers, E. M. (1983). *Diffusion of innovation* (3rd ed.). The Free Press.
- Rowlands, J. (1995). Empowerment examined. *Development in Practice*, 5(2), 101–107.
- Scheirer, A. M. (1987). Programme theory and implementation theory: Implications for evaluators. In L. Bickman (Ed.), *New directions for program evaluation*, Vol. 33: *Using program theory in evaluation* (pp. 40–68). Jossey-Bass.
- Sharma, P., & Varma, S. K. (2016). Women empowerment through entrepreneurial activities of self-help groups. *Indian Research Journal of Extension Education*, 8(1), 46–51.
- Sibota, E. N. (2010). *The relationship between empowerment and motivation of supervisors on multi-national petroleum firms in Kenya*. University of Nairobi.
- Spencer, R. (2018). *Nutrient requirements of sheep and goats*. Alabama Cooperative Extension System.

- UNDP. (2013). *Humanity divided: Confronting inequality in developing countries*. UNDP.
- Warner, L. A., Silvert, C. J., & Bengt, M. (2019). Using adoption and perceived characteristics of fertilizer innovations to identify extension educational needs of Florida's residential audiences. *Journal of Agricultural Education*, 60(3), 155–172.
- Wisdom, J., & Cresswell, J. W. (2013). *Integrating quantitative and qualitative data collection and analysis while studying patient centered medical home models*. AHRQ.
- WOCAN. (2016). *WOCAN's theory of change*. WOCAN.
- World Bank. (2020). *Poverty data: Sub-sahara*. World Bank.