

Income gains without sustainability? Evaluating matching grants for smallholder farmers in Chipili District, Zambia

David Banda¹
Austin Mwange²

¹davidbanda35@gmail.com

^{1,2}The University of Zambia, Zambia

<https://doi.org/10.51867/ajernet.7.1.52>

ABSTRACT

One of the most common programs to boost smallholder farming enterprises in Africa is a matching grant program, although there has been mixed evidence of whether short-term increases in income can be translated into long-term sustainability of enterprise. This study explores the effect of matching grants on household income, savings, and sustainability of smallholder farming businesses in the sustainable operation of Chipili District in the long term. This study is anchored in the Sustainable Livelihoods Framework (SLF), which posits that access to productive assets and financial capital enhances livelihood outcomes only when supported by institutional structures and enabling environments. The study analyzes post-grant enterprise continuity based on a survey that was undertaken on 352 respondents and evaluates the potential demographic factors contributing to enterprise continuity. Econometric models such as logistic regression and propensity score matching are utilized in the analysis to determine the causal effect of matching grants on household savings and income. The findings suggest that the matching grants raised household income and savings by a significant margin in the short term, but merely 19.6 percent of beneficiary enterprises continued to operate after the grant, and 80.4 percent of these enterprises stopped their operations. The demographic characteristics were found not to have a statistically significant relationship with the survival of the enterprise. The study concludes that matching grants are useful for improving short-term household welfare but are not enough to ensure long-term business sustainability. It recommends strengthening post-grant mentorship, improving access to markets, supporting value chain participation, and providing continued extension services to help smallholder enterprises remain sustainable over time.

Keywords: Income and Savings, Matching Grant, Smallholder Farmers, Sustainability

I. INTRODUCTION

Matching grant programmes in agriculture have been primarily implemented to increase agricultural productivity, improve nutrition, enhance food security, and increase income (Bizikova et al., 2020; Musa & Dahiru, 2025), more especially in rural areas where poverty levels are high. In Zambia, poverty levels are quite high; according to ZambiaStatisticsAgency (2022), 60% of the Zambian population live in poverty and rural areas like Chipili the rural poverty level increased from 76.6% to 78.8% in 2022. Matching grant initiatives have been used in most sub-Saharan African countries as a tool to improve the welfare of rural smallholder farmers and alleviate poverty (McKenzie et al., 2017; Sberro-Kessler, 2019). Globally, several recent studies have evaluated their impact on yields, incomes and consumption. For example, Carter et al. (2021) report that a randomised maize subsidy in Mozambique significantly increased adoption of high-yielding inputs and maize yields, with benefits persisting after the subsidy ended. In that study, treated farmers and their peers enjoyed large, sustained gains in yields and inferred profits even in post-subsidy seasons.

Despite these concerted efforts and financial investments in matching grant programmes by various organisations, the sustainability of these farming enterprises supported by the matching grant initiatives has been a challenge, and their contribution to improving household income and savings after the matching grant remains uncertain. The sustainability of these programs' effects varies. Carter et al. (2021) found that the Mozambique subsidy's impacts on technology adoption and yields persisted in subsequent seasons (after the program ended), suggesting farmers continued using the improved practices they learned.

In Rwanda, Hossain et al. (2022) similarly report that the matching-grant intervention had long-term positive impacts on farmers' livelihoods. However, one-time seed distributions may be less durable: a 10-year follow-up of Tanzanian vegetable seed-kit recipients found only about 25% of farmers continued using the introduced seed varieties after 5–10 years. This low persistence was partly attributed to lack of seed-saving knowledge and post-project support, underscoring the need to pair seed donations with extension. Furthermore, The Rural Agro-enterprise Partnership for Inclusive Development and Growth (RAPID-Growth) project in the Philippines provides a notable example of matching grant implementation in agricultural settings. Operating across six regions of Mindanao and Region VIII, the project

focuses on key value chains including cacao, coconut, coffee, and processed fruits and nut (Briones et al., 2023). The baseline survey reveals that the matching grant scheme has shown effectiveness in farmer organization (FO) empowerment, capacity development, and private sector involvement, though challenges remain including the absence of robust monitoring and evaluation systems (Briones et al., 2023).

Likewise, program impact evaluations of certain Matching grants have shown increased access to finance and capacity to produce and gain short-term incomes (Development, 2018). Nevertheless, it is unclear whether enterprises provided with matching grants can be sustained in the long run. Very little research has trailed the survival of these enterprises beyond the period of the grant or the alleviation of initial incomes into sustainable growth in terms of household savings and financial security. Thus, it is clear that most studies focus on short-term income and expenditure, and few measure changes in formal savings explicitly. The literature also exposes some of the critical gaps. majority of matching grant research in Zambia and other African settings is input-output based, including greater yields or direct income, but it does not address post-grant performance measures like enterprise survival, profitability, and household saving behavior. As an example, Hossain, Hossain et al. (2022) show that a matching grants scheme in the horticultural sector in Rwanda caused the household income and asset holdings of over-cut-off scheme participants to rise.

McKenzie et al. (2017) detected additionality in a matching grant programme to small firms in Yemen, but they noted that it was necessary to consider whether or not such firms would have made investments without the grants. More recently, Grimm et al. (2024) compare matching and cash grant in a fragile rural environment and demonstrate that they both increased survival and business practices, but matching grants did not also increase profits and employment on the medium term casting doubts on sustainability.

All these studies, however, point to potential of matching grants, but also point out the lack of literature on matching grants on the long-term operation status of enterprises after grant and the extent to which the gains in income brought about by the grant lead to accumulation of savings and long-term improvement of livelihood, which is precisely what is being studied in the present study in Chipili district of Zambia. It is crucial to understand these dynamics to be able to design future agribusiness development interventions that do not just aim at short-term gains but also contribute to long-term enterprise and livelihood sustainability.

This paper aims to establish the extent to which smallholder farmers' enterprises remained operational and thrived post-matching grant, and to determine the effect of the matching grant on income and savings among smallholder farmers in Chipili District. Thus, this paper contributes to and improves the existing literature by examining the effect of the matching grant on income and savings among smallholder farmers using propensity score matching and binary logistic regression. The analysis predicts whether smallholder farmer enterprises supported by the Matching Grant Facility Remained Operational and Thrived Post-Intervention in Chipili District.

1.1 Research Objectives

- i. To examine the impact of matching grants on household income and savings among smallholder farmers in Chipili District.
- ii. To assess the long-term sustainability and continuity of smallholder farming enterprises supported by matching grants in Chipili District

II. LITERATURE REVIEW

2.1 Theoretical Review

The present study is underpinned by the Sustainable Livelihoods Framework (SLF). The SLF clarifies that individuals require not only money to enhance their well-being, but they also require access to various forms of resources and assistance to develop sustainable livelihoods. Based on this framework, sustainable livelihoods are based on availability of assets like natural, human, financial, social and physical resources, which individuals utilize to engage in various activities and strategies which in the long-run enable them to manage shocks and stress and advance their livelihood conditions (Scoones, 2015). In development studies, the SLF has been extensively applied to learn the impacts of interventions such as grant on households and their long-term sustainability in economic activities (Morse, 2025; Scoones, 2015)

2.2 Empirical Review

Empirical data on the impacts of matching grants on farm productivity and farm income generation is inconclusive and very context-specific. In Rwanda, Hossain et al. (2022) record high positive effects on incomes, employment, firm growth, and assets accumulation of horticultural recipients over the long-term. Those gains were the strongest when grants were linked to the viable value chain and supported by the market access and extension services, which is why the institutional and market integration is important.

Nevertheless, Burkina Faso also provides some counter-evidence, as a randomized controlled trial conducted by Grimm et al. (2024) revealed unconditional cash grants to be better than comparable grants in terms of sustaining business and accumulating capital. Matching grants have less significant and statistically insignificant impacts on profits and employment, especially where liquidity constraints and investment risk constrained co-finance by beneficiaries. This implies that the impact of cost sharing-needs can be undermined in capital-constrained settings.

The significance of design and beneficiary attributes is supported in other country-level studies. In Pakistan, Burki (2015) shows that matching grants increased profitability and technical efficiency, particularly among group leaders, but the benefits were not equally distributed in groups. Equally, Mullally and Maffioli (2016) find a rise in production and sales in Uruguay with equivalent grants, but the income returns were smaller when program costs were factored-in, which raises questions of cost-effectiveness.

The fact that there is possibly income improvement by induced private investment is backed by broader cross country evidence. Hossain et al. (2022) and McKenzie et al. (2017) reveal that the matching grants encourage productive activities and capital deepening but the results can vary based on the quality of implementation, sectoral setting, ability of beneficiaries, and additional services. The fact that there was additionality in the sense that the kind of investments that are being supported would otherwise not have happened without the grant is especially important in genuine income and employment impacts (Alexandre et al., 2025; McKenzie et al., 2017).

Income effects are also reinforced by institutional involvement. Wang et al. (2023) obtain the result of propensity score matching that cooperative membership raised household earnings by 7.04% and asset holdings by 4.19, through greater access to market, lower transaction costs, and productivity spillovers. Dairy industry evidence indicates the cooperative members who received equal grants received a cost advantage of = -13-17 per liter and experienced a net return advantage of = +6 more, as they were able to produce six more liters per animal per day. The results highlight the importance of group behavior and cost-efficiency in productivity.

In the Zambian context, Kabengele (2015) compares matching grants and microcredit in Mazabuka District and finds both tools affected profitability in the farm. However, equivalent grant recipients had a more rapid increase in profits because there were few repayment pressures and less exposure to interest rate risks so they could invest in productive assets without the need to settle debt. In a larger rural setting, Zreik and Haron (2025) demonstrate that social financial grants with matching elements had a large positive impact on household income and the lack of poverty through the promotion of income-generating activities, assets accumulation, consumption smoothing, and consistent with shock resilience.

Additional financial interventions also have an impact. Ogundeji et al. (2018) determine in Lesotho that credit access had an increase in net farm revenues to the tune of US\$116.608-US\$136.894 with savings behavior, association membership, and record-keeping influencing access. In the same vein, Adetoyinbo et al. (2025) document a 40.52 percent income growth where microcredit was used with use of technology implying that similar gains can be accrued with matching grants that fund capital investments.

In addition to incomes, the savings and financial resilience are still conditional. The need to pay a cost-sharing can motivate the prior mobilization of savings and financial discipline (Steinert et al., 2018), whereas the income of agricultural investments can enhance the ability to save money (Bali Swain & Nsabimana, 2024; Ma et al., 2023; Midamba et al., 2024). However, the increase in income does not always turn into an increase in savings because households tend to focus on consumption and social commitments (Beaman et al., 2021).

Incentives in matched savings are used to encourage an increase in the frequency of savings, not necessarily in total balances (Wang et al., 2018), and the determinants include income variability and financial access (more frequently than income itself) (Midamba et al., 2024). Precautions and investment-oriented savings are promoted through the use of formal and semi-formal savings mechanisms (Steinert et al., 2018), whereas digital savings products in Mozambique promoted savings accumulation and agricultural investment to a considerable extent (Batista & Vicente, 2020). VSLAs and other informal institutions enhance access and are also conditional on the quality of governance (Karlan et al., 2017; Ksoll et al., 2016). A study in Indonesia, South Africa, and Uganda, revealed that financial literacy also enhanced precautionary savings and inclusion (Akande et al., 2023; Duvenhage et al., 2025; Midamba et al., 2024; Retnoningsih & Chung, 2025). Nevertheless, the social substitution effects can decrease individual savings in case of an increase in peer credit access (Seidu et al., 2025).

Comprehensively, literature has shown that matching grants can improve productivity, income and financial resilience in the event of a combination with a robust institutional support, market access, financial inclusion measures, and literacy training. Financial and behavioral structures are essential to supplement income gains.

III. METHODOLOGY

3.1 Research Design

This research study adopted a quantitative research design in order to examine the performance of smallholder farmers enterprises after taking part in the Matching Grant Facility and in order to determine the effect of the grant on the household income and savings. The quantitative method was suitable in defining statistical links among key variables, as well as quantifying the gap between beneficiaries and non-beneficiaries of the Matching Grant Facility.

3.2 Study Area

The study was conducted in Chipili District in the Luapula Province of Zambia. The district was chosen since it has a large population of smallholder farmers who are beneficiaries of the matching grant programme. Chipili relies on agriculture as the primary source of livelihood, which makes it an appropriate location in which to examine long-term operation sustainability of Matching Grant Facility supported enterprises and the impact of the grant on rural incomes and savings.

3.3 Target Population

The participants of the Matching Grant Programme were targeted in this study and were divided into two agricultural camps: Kalundu (225 farmers, 44.2%) and Lupososhi (271 farmers, 55.8%). This stratification gave the research the chance to have the general effects of the programmes and the distinct experiences of farmers at each camp. The clear target population allows making findings meaningful and credible (Creswell & Plano Clark, 2018).

3.4 Sampling Procedure and Sample Size

The sample was smallholder farmers in a rural area (Chipili District) which included beneficiaries of Matching Grant as well as non-beneficiaries. To make sure that every eligible farmer had an equal opportunity of being selected, simple random sampling method was adopted. The formula that was used in calculating the sample size was the formula provided by Yamane (1967) with a 5% margin of error respective to the sample size which gave an initial size of 221. The sample size was raised to 246 after the correction of a non-response rate of 10%. After data collection in the field, 352 respondents were finalized as the final effective sample that comprised of beneficiaries and non-beneficiaries. This was ensured to maintain a 2:1 ratio between beneficiaries (treatment) and non-beneficiaries (control) to highlight the results in the grant recipients because this is the recommendation in impact evaluation research (Duflo et al., 2007).

3.5 Data Collection

A structured closed-ended questionnaire was used to collect primary data in a form of face-to-face interviews. The questionnaire included information on household socio-demographic, enterprise operation status, sources of income and savings behaviour. The instrument was pre-tested to make it clear, valid and reliable. The interviews were done by trained enumerators, and the respondents were asked to participate in the interviews voluntarily after giving informed consent.

3.6 Data Analysis Techniques

Data were analysed using Stata statistical software. Two main econometric techniques were applied to address the study objectives:

3.6.1 Binary Logistic Regression

A binary logistic regression was employed to identify the socio-economic and farm-oriented factors that affect the existence and non-existence of beneficiary enterprises under the Matching Grant Facility after the project implementation. The dependent variable assumed the value of 1 when the enterprise was operational and 0 when non-operational. Independent variables were the age, education, size of household, size of farm, access to extension services, training and level of investment among others. The model approximated the likelihood of an enterprise beneficiary surviving as an enterprise as a result of these factors.

3.6.2 Propensity Score Matching (PSM)

The study used Propensity Score Matching (PSM) to examine the effects of the Matching Grant Facility on the household income and savings. This was the way to control selection bias that might have been brought about by observable differences between beneficiaries and non-beneficiaries. The estimation of propensity scores was done using a logistic regression model and dependent on the variables like education level, household size, farm size, access to credit and extension services. The nearest neighbor matching was then used to match the beneficiaries and non-

beneficiaries having similar propensity scores. Their ensuing differences in the mean outputs in the two groups gave estimates of the net effect of the MGF on the Treated the Average Treatment Effect on the Treated (ATT).

3.7 Ethical Considerations

This study received the ethical approval of the University of Zambia (humanities and social science research ethics committee). Furthermore, permission was sought from the Ministry of Agriculture. Each of the participants was informed of the aim of the study and their rights to confidentiality and voluntary participation. The anonymity of respondents was ensured, and the collected data were stored safely and could be used only with the purpose of academic research.

IV. FINDINGS & DISCUSSION

4.1 Descriptive Statistics

4.1.1 Socio-Economic Characteristics of Respondents

Table 1 gives a summary of socio-economic features of both the beneficiaries and non-beneficiaries of the Matching Grant Facility (MGF) in Chipili District. According to the analysis, significant differences between the two groups are evident especially in age distribution, education level and farm size which are statistically significant as indicated by chi-square results ($p < 0.05$).

The respondents were of an age that was below 30 years as well as above 50 years. The findings show that the number of beneficiaries aged 40-49 years was 40.8, then 25.4 years aged 30-39 years, and under 30 years old was 24.6. In the non-beneficiaries, the proportion was relatively high (33) in the age group of 40-49 years, 31.3 in the age group of 30-39 years and 19.6 in the age group of 50 and above. The chi-square test ($\chi^2 = 11.39$, $p = 0.010$) indicates that the relationship between the age and the participation of the Matching Grant Facility is statistically significant. This indicates that the older heads of households have higher chances of being involved in the programme perhaps owing to years of farming experiences and access to productive factors of production like land and capital.

The results indicate that majority of the sampled households were male headed. Of the beneficiaries, 61.3 percent were males to 66 percent of the non-beneficiaries, and 38.8 percent and 33.9 percent of the beneficiaries and non-beneficiaries, respectively. The outcome of the chi-square test ($\chi^2 = 0.76$, $p = 0.383$) shows that there is no significant difference in terms of gender and participation in the programme. This means that the women were more or less equally given a chance to participate in the Matching Grant Facility though the men continue to control the agricultural industry in rural Zambia.

The two groups differed in terms of their education levels ($\chi^2 = 23.625$, $p = 0.000$). More than half (53.8) of the beneficiaries had received primary education, 26.3% had no formal education and 20% secondary education. None of the beneficiaries was tertiary educated. On the other hand, 60.7% of non-beneficiaries were primary educated, 27.7% were secondary educated and 3.6% were tertiary qualified. The educational attainment of the non-beneficiaries can also be higher, which can indicate a higher exposure to formal jobs, which do not need the use of agricultural support programmes like the MGF. Conversely, the low educational level of the beneficiaries could have contributed to the choice of doing more farming as a main livelihood activity.

Most of the respondents practiced crop production (78.3% of beneficiaries and 92.9% of non-beneficiaries). The proportion of mixed farming was observed between 21.7% among 21.7% beneficiaries and 1.8% non-beneficiaries with livestock-only farming being uncommon. There was a statistically significant relationship between the primary agricultural activity and the involvement in the Matching Grant Facility ($\chi^2 = 34.474$, $p = 0.000$). This implies that the Matching Grant Facility has been especially appealing to farmers in diversified farming systems because mixed farming can provide more resilience and income stability.

The household size was not statistically significant when it came to participation in the programme ($\chi^2 = 4.157$, $p = 0.245$). Fifty percent (50) of the respondents had 3-5 members in their households and 38.6 had 6-8 members in their households. The 1-2 member and the above 8 member households contributed 4.8% and 6.5% respectively. The results suggest the household size could not be a decisive factor in participating in the programme, though bigger households could have more availability of family labour to work in the farm.

The size distribution of farms reveals that over half (52.5) of the beneficiaries possessed farm sizes of 5 hectares and above whereas only 41.1% of non-beneficiaries had farm sizes of the same size. The size of the farm and the involvement in the programme had a significant association ($\chi^2 = 16.341$, $p = 0.001$). This shows that the households with bigger farms were more likely to receive the Matching Grant Facility, perhaps because they could satisfy requirements related to the program in terms of co-financing or documentation of land ownership.

Table 1*Descriptive Statistics of Variables*

Variable	Beneficiaries (N=240) (%)	Non-Beneficiaries (N=112) (%)	Total (N=352) (%)	χ^2 (p-value)
Age				
Under 30	59 (24.6)	18 (16.1)	77 (21.9)	
30–39	61 (25.4)	35 (31.3)	96 (27.3)	
40–49	98 (40.8)	37 (33.0)	135 (38.4)	
50 and above	22 (9.2)	22 (19.6)	44 (12.5)	$\chi^2 = 11.39$ (p = 0.010)
Gender				
Male	147 (61.3)	74 (66.0)	221 (62.8)	
Female	93 (38.8)	38 (33.9)	131 (37.2)	$\chi^2 = 0.76$ (p = 0.383)
Education Level				
No formal education	63 (26.3)	9 (8.0)	72 (20.5)	
Primary	129 (53.8)	68 (60.7)	197 (56.0)	
Secondary	48 (20.0)	31 (27.7)	79 (22.4)	
Tertiary	0 (0)	4 (3.6)	4 (1.1)	$\chi^2 = 23.625$ (p = 0.000)
Main Farming Activity				
Crops	188 (78.3)	104 (92.9)	292 (82.9)	
Livestock	0 (0)	6 (5.4)	6 (1.7)	
Mixed	52 (21.7)	2 (1.8)	54 (15.3)	$\chi^2 = 34.474$ (p = 0.000)
Household Size				
1–2	15 (6.3)	2 (1.8)	17 (4.8)	
3–5	115 (47.9)	61 (54.5)	176 (50.0)	
6–8	93 (38.8)	43 (38.4)	136 (38.6)	
More than 8	17 (7.1)	6 (5.4)	23 (6.5)	$\chi^2 = 4.157$ (p = 0.245)
Farm Size (hectares)				
Less than 1	20 (8.3)	10 (8.9)	30 (8.5)	
1–2	48 (20.0)	13 (11.6)	61 (17.3)	
2–5	46 (19.2)	43 (38.4)	89 (25.3)	
More than 5	126 (52.5)	46 (41.1)	172 (48.9)	$\chi^2 = 16.341$ (p = 0.001)

4.1.2 Performance of Farming Enterprises among Beneficiaries

Table 2 provide details of the performance of farming enterprises founded or assisted by the Matching Grant Facility (independent variable). The results indicate that most of the enterprises were not still in operation during the data collection period implying that the funded enterprises could not be maintained after the support period.

Among the 240 assessed beneficiary farming enterprises, 47 only (19.6 percent) were reported to be functioning, and 193 others (80.4 percent) were no longer functioning. This observation means that majority of the farming enterprises that were started under the Matching Grant Facility were either shutting down or inactive. The non-operational rate of farming enterprise is a question of the enterprise sustainability (dependent variable) and resilience of the matching grant-funded projects in the long run. This might be due to various reasons like lack of proper technical support of the grant after it had been given, lack of business management skills of the beneficiaries or market constraints that made further production difficult.

Regarding the years of operation, most of the operational farming enterprises (70.4) had less than one year of operation, 19.6% had been in operation between one and two years and 10% had been in operation between two and three years. The high turnover of most farming enterprises in terms of their short-term operations highlights why it is difficult to be viable after the first grant funds and project management are over. It also implies that most of the beneficiaries might have failed to adjust to the market condition or to reinvest profits to continue with the business.

Table 2*Summary of Farming Enterprise Performance Post-Grant*

Parameter	Category	Frequency (N=240)	Percentage (%)
Operational Status	Operational	47	19.6
	Not Operational	193	80.4
Years Operational	Less than 1 year	169	70.4
	1–2 years	47	19.6
	2–3 years	24	10.0

4.1.3 Predictors of Operational Outcomes among Beneficiary Enterprises

The findings of a binary logistic regression model are shown in Table 3 to determine the socio-economic and farm related factors that affect the operation or non-operation of the beneficiary enterprises under the Matching Grant Facility (independent variable). The dependent variable is a status of the enterprise (1 = operational, 0 = not operational). The total model did not significantly differ (LR 2 (7) = 9.22, $p = 0.237$), and the Pseudo R² of the model was 0.0389, which means that the predictors in the model explain about 3.9 percent of the variability in enterprise operational outcomes. This implies that there are other unobservable factors, which can contribute a greater role towards continuance of enterprises following the MGF intervention.

The age coefficient was negative ($b = -0.026$, $p = 0.88$) which means that older beneficiaries were a little less likely to retain operational enterprises, but this correlation was not significant. This means that age, as a surrogate of experience or risk aversion, is irrelevant to enterprise sustainability in this case. No significant effect of gender was observed on the status of operations of an enterprise ($b = 0.034$, $p = 0.931$). Male headed and female headed households had equal chances of maintaining their projects. This observation concurs with previously reported descriptive findings which indicated equal participation rates between the genders implying that both the male and the female beneficiaries encounter similar post grant operational challenges.

The statistically significant impact of education on enterprise sustainability was also absent ($b = 0.141$, $p = 0.641$). Negative coefficient implies that the level of education is not always associated with better management or resilience of enterprises, which can also be attributed to the fact that most farming businesses rely on the experience and access to resources more than on education. On the same note, marital status ($b = -0.219$, $p = 0.368$) was not significant and this means that, there was no quantifiable effect of marital status on the probability of maintaining an operational enterprise; be it married, single or widowed.

Enterprise operation was positively, but not significantly related to household size ($b = 0.3$, $p = 0.315$). Although bigger families might supply more family labour in the fields, this was not significant to forecast the success of the operations. The size of the farm was found to have a negative correlation with operational results ($b = 0.854$, $p = -0.035$), but not significantly. The finding indicates that landholding size was not the sole determinant of enterprise survival and this could imply that there are other forces like access to capital, inputs or market connections which are more important in determining success. The nature of primary farming activity also impacted negatively on the operation of the enterprise but not significantly ($b = -0.409$, $p = 0.114$). Despite the fact that mixed farming and crop-oriented enterprises were the most widespread among beneficiaries, such patterns were not reflected in important operational differences.

It is evident that all the socio-economic factors incorporated in the model did not become important predictors of operational status. The findings indicate that though demographic and farm related aspects might be determinants of participation in the MGF, they are weak predictors of long-term sustainability of the enterprise. The results of regression support the descriptive results provided in Table 2 that indicated that only a minor percentage (19.6) of enterprises that benefited survived. The fact that the statistically significant predictors in the logistic model are not significant points to the fact that the sustainability of such enterprises cannot be satisfactorily explained by the socio-economic features including age, gender, education, or household size. Rather, the prevalent non-functional position of the enterprises is probably due to structural and institutional limitations to which the individuals who benefit are not in control.

Table 4*Binary Logistic Regression Analysis*

Predictor	Coefficient	Std. Error	z-value	p-value	95% CI Lower	95% CI Upper
Age	-0.026	0.174	-0.15	0.88	-0.367	0.314
Gender	0.034	0.393	0.09	0.931	-0.737	0.805
Education	-0.141	0.302	-0.47	0.641	-0.734	0.452
Marital Status	-0.219	0.244	-0.90	0.368	-0.697	0.258
Household Size	0.3	0.299	1	0.315	-0.285	0.886
Farm Size	-0.035	0.19	-0.18	0.854	-0.407	0.337
Main Farming	-0.409	0.258	-1.58	0.114	-0.916	0.098
Constant	-0.902	1.443	-0.63	0.532	-3.730	1.926
Model Statistics						
Statistic	Value					
Number of observations	240					
LR χ^2 (7)	9.22					
Prob > χ^2	0.237					
Pseudo R ²	0.0389					
Log Likelihood	-114.085					

The results of this study show that most of the projects supported by the Matching Grant Facility (MGF) were not sustainable. Only 19.6% of the enterprises were still operating at the time of data collection, while 80.4% had stopped operating. This clearly indicates serious sustainability challenges. These findings are consistent with earlier evidence from the world bank study by Sberro-Kessler (2019), which reported that about 30% of common interest groups that received matching grants in India were not operating effectively after project completion. Both studies suggest that once financial support ends, many enterprises struggle to survive.

The findings also agree with the study by Grimm et al. (2024), which compared matching grants with unrestricted cash grants using a randomized control trial. After two years, beneficiaries who received cash grants showed higher business survival rates and better practices, while those who received matching grants showed smaller and often insignificant improvements in profits and sales. This supports our finding that matching grants alone do not guarantee long-term enterprise survival. In our study, even household characteristics such as age, gender, and education did not significantly influence whether enterprises continued operating. This suggests that access to the grant itself was not enough to ensure sustainability.

However, our findings differ from evidence reported by the WorldBank (2024) in Congo, where more than 80% of beneficiary groups under a matching grant scheme were still operating, and only about 10–15% had failed. This survival rate is much higher than the 19.6% observed in Chipili and Mansa districts. The contrast shows that context and program design matter. In the Congo case, there may have been stronger institutional support, better monitoring, continuous technical assistance, or better market access. This comparison suggests that matching grants can produce better sustainability outcomes if they are supported by strong complementary measures.

Furthermore, the differences in survival rates between countries show that giving money alone does not always help businesses continue operating. To understand why many farming enterprises in this study failed even after receiving grants, we can use the Sustainable Livelihoods Framework. According to Scoones (2015) and Morse (2025), people need more than money to improve their lives. They also need skills, knowledge, land, equipment, social support, and access to markets. In Chipili District, many farmers may not have had enough training, market access, good infrastructure, or strong support networks. Because of this, they found it difficult to continue their farming enterprises after the grant ended. This shows that money alone is not enough. Farmers also need continuous support and other resources to keep their farming enterprises running for a long time.

4.2 Empirical Findings

4.2.1 Effect of the Matching Grant Facility on the Income

The study also used a propensity score matching (PSM) model to determine the effects of the Matching Grant Facility (Independent variable) on the income levels of the participating farmers. Table 4 shows the findings of the treatment-effects estimation using 352 observations in which income change was the outcome variable. A logit specification was used to estimate the treatment model and matching was done with one nearest neighbour to each unit treated to provide comparability between the beneficiaries and non-beneficiaries who share similar observable characteristics.



The findings indicate that the statistical significance and positive impact of independent variable -participation in the Matching Grant Facility on dependent variable-household income were statistically significant. The estimated ATET coefficient of 543.71 ($z = 26.79, p < 0.001$) means that on average the participants of the Matching Grant Facility experienced an increase in income of about ZMW 543.71 more than other non-beneficiaries. The accuracy and strength of the estimate is also attested by the 95 percent confidence interval (503.93 to 583.50). This implies that the Matching Grant Facility was effective in increasing the income generation capacity of the farmers involved and thus access to grant funds led to higher productivity and profitability among beneficiaries despite short gains.

Table 5

Propensity Score Matching Estimates of the Effect of the Matching Grant Facility on Income

Estimator: Propensity-score matching. Outcome model: Matching. Treatment model: Logit. Number of observations = 352. Matches requested = 1 (Min = 2, Max = 23).						
Variable	Coefficient (Coef.)	Std. Error	z-value	p-value	[95% Confidence Interval]	
ATET Matching Grant Farmer (2 vs 1)	543.7125	20.298	26.79	0.000	[503.9294, 583.4956]	

Note: ATET = Average Treatment Effect on the Treated

The results show that the Matching Grant Facility (MGF) had a positive and statistically significant effect on household income. This means that participation in the MGF helped smallholder farmers increase their earnings. The grant support likely enabled beneficiaries to buy farming inputs, improve infrastructure, and use better technologies. These improvements may have increased productivity and profits. Therefore, matching grants can be considered an important rural development tool for improving short-term income among smallholder farmers.

These findings agree with previous studies. For example, Hossain et al. (2022) found that a matching grant scheme for horticultural farmers in Rwanda increased farm income as well as non-farm earnings. Beneficiaries also hired more labor and increased their assets. Similarly, Kisusi and Ndesanjo (2023) reported that in Tanzania, participation in community-driven development projects supported by matching grants increased household income by about 6% and improved asset ownership by 10%. In Zanzibar, Ali et al. (2024) found that cooperative members who benefited from grants earned on average 28% more than non-members. These studies support our finding that matching grants can improve income levels when farmers receive financial support for productive activities.

However, when these income results are considered together with the findings on enterprise survival, an important issue emerges. Although the MGF increased income, many of the supported enterprises were no longer operating. This suggests that the income gains may have been short-term. Without strong institutional support, continuous training, and stable market access, the benefits of matching grants may not last. Therefore, while the MGF was effective in improving income, its long-term sustainability remains a concern. According to the Sustainable Livelihoods framework, financial capital is among the major assets, which can be used to enable households to enhance their livelihoods. Through the matching grants, the MGF has enhanced the financial and physical capital of farmers and this has enabled them to enhance productivity and incomes. But the framework also states that sustainable livelihoods can be achieved with other types of capital which may be skills, market access and social support. This helps explain why income increased but many enterprises did not survive in the long term.

4.2.2 Effect Of The Matching Grant Facility On Savings

The average treatment effect on the treated (ATET) was also estimated using the propensity score matching (PSM) model to determine the effect of participation in the Matching Grant Facility (independent variable) on household savings (dependent variable) of the farmers. Table 6 shows the findings with 352 observations, a logit model to estimate treatment and one-to-one nearest-neighbor matching to match beneficiaries with similar non-beneficiates. This methodology assisted in minimizing selection bias and facilitating differences in savings results to be accredited with more dependability to the impact of the MGF intervention and less to prior disparities between the two groups.

The findings indicate a positive and statistically significant effect of participation in Matching Grant Facility (independent variable) on household savings (dependent variable). The ATET coefficient, 157.38 ($z = 13.49, p < 0.001$) suggests that on average, MGF beneficiaries had savings that were around ZMW 157.38 greater than those of non-beneficiaries who had the same observable characteristics. The strength of this effect is ensured by the 95% confidence interval (134.50 to 180.25). It means that the Matching Grant Facility had the advantage of boosting the financial



stability of the involved farmers by making their ability to save some of their income or profits earned through farming processes.

Table 6

Propensity Score Matching Estimates of the Effect of the Matching Grant Facility on Savings

Estimator: Propensity-score matching. Outcome model: Matching. Treatment model: Logit. Number of observations = 352. Matches requested = 1 (Min = 2, Max = 23).						
Variable	Coefficient (Coef.)	Std. Error	z-value	p-value	95% Confidence Interval	
ATET Matching Grant Farmer (2 vs 1)	157.375	11.669	13.49	0.000	[134.504, 180.246]	

Note: ATET = Average Treatment Effect on the Treated

The positive effect of the Matching Grant Facility (MGF) on savings shows that the program increased not only income but also the ability of farmers to build financial capital. Increased savings enable the households to cope with the economic shocks and proceed with reinvestment in other productive activities like purchasing inputs or even expanding their farms. These findings agree with Ma et al. (2023), who found that agricultural finance improves savings behavior among smallholder farmers. Similarly, the World Bank (2024) reported that agricultural grants strengthen savings culture and support livelihood stability. Using the Sustainable Livelihoods Framework, savings represent an important form of financial capital that supports livelihood improvement. However, financial capital alone is not enough for long-term sustainability. When combined with the earlier finding that many enterprises stopped operating, the results suggest that the MGF generated short- to medium-term financial benefits (income and savings) but faced challenges in sustaining enterprises over time. Stronger institutional support and financial literacy may improve long-term outcomes.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study shows that the Matching Grant Facility increased the income and savings of smallholder farmers in the short term, helping them improve financial security. However, many funded farming enterprises stopped operating, showing problems with long-term sustainability, limited benefit sharing, and challenges such as poor market access and weak infrastructure.

5.2 Recommendations

To improve sustainability, it is recommended that the government should support better access to markets and provide guidance after the grant ends. Farmers should reinvest income, improve business and financial skills, and work together in cooperatives to share knowledge and resources. International organizations should provide technical support, financial literacy programs, and help build partnerships that keep businesses running after the grant period. These actions can help matching grants give lasting benefits to rural livelihoods instead of only short-term gains.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding Declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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