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Enhancing Sustainable Livelihoods Through Matching Grants: Multidimensional Evidence from Chipili, Zambia

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ABSTRACT

The smallholder farmers in Zambia have been constant victims of the lack of financial resources, technical expertise, and sustainable agricultural extension, which restricts their livelihood prospects and sustainability. This paper gives an analysis of the role of cooperative-level matching grants in promoting multidimensional livelihood capitals among smallholder farmers in Chipili District: human, social, financial, and natural. The survey data were obtained with 352 respondents (240 grant beneficiaries and 112 non-beneficiaries), and the results were analysed in terms of socioeconomic factors with such variables as age, education, farm size, household size, gender, and farm experience. Analyses of reliability established high internal consistency of all livelihood-capital indices (Cronbachs 0.67 or more). Descriptive statistics and independent-samples t-tests showed consistently greater scores among the grant beneficiaries in all dimensions of the capital, and medium-to-large effect sizes in human, financial, and natural capital. Adjusted ordinary least squares regressions, controlling for individual characteristics and clustering at the cooperative level, showed that grant participation remained significantly associated with increased livelihood-capital scores ($p < 0.001$). These findings indicate that matching grants that incorporate trainings provided to cooperatives may assist farmers to learn better farming skills and practices, and better management of their resources. Policy makers and development agencies ought to think of extending these matching grants and incorporate follow up support to enable small holder farmers to advance their capacities and enhance sustainable rural livelihoods.

1. Introduction

Farming is not only an economic activity to millions of rural families throughout sub-Saharan Africa, but it is the foundation of livelihoods. With an ideal rural agricultural economy, smallholder farmers are able to obtain sufficient training, finances, safe land, and social networks that in combination can allow them to manage risks, embrace better technologies, and receive sustainable income. They apply the knowledge to make more out of less, they tap into the financial services to cushion the shocks and also manage the natural resources in a manner that makes them sustainable and in a way that benefits the generations to come. But in actuality, this ideal is something that is very far-fetched to many. Smallholders are often subjected to poor access to effective agricultural training, credit facility, low institutional support, and poor quality of natural resources. All these unrelenting gaps compromise resilience and generate vulnerability and poverty cycles (Barrett et al., 2006; Scoones, 2015)

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Smallholder farmers in Zambia, and especially in the rural areas like the Chipili district are dealing with these very limitations. Despite the fact that agricultural sector is the core of the national food security system and rural jobs, a large portion of farmers has insufficient skills to implement better agronomic practices or even to effectively interact with the markets(Lungu et al., 2024; Teschemacher et al., 2023). The credit markets are still tight and farmers are forced to make use of informal borrowings at high rates. Meanwhile, climate variability and soil degradation increase livelihood risks, especially to those who are strongly dependent on rain-fed-based cropping systems(Ngoma et al., 2024; Sawe, 2025). It is against this backdrop that a number of support mechanisms by development practitioners and policy makers have been implemented, such as matching grants schemes aimed at filling financial and knowledge deficits through linking co-financing with capacity-building aspects.

Matching grants partial subsidies based on recipient contributions, usually in conjunction with training and technical assistance, have been more widely adopted in development programs in Africa. Theoretically, they provide a means to balance incentives and program assistance: farmers can invest their resources, which theoretically would result in a higher level of commitment and sustainability, and external money would lower financial barriers(Fallas Conejo & Sánchez, 2024; Sberro-Kessler, 2019). Quasi-experimental designs have also found positive short-term effects of matching finance schemes on productive investments and business growth in Rwanda and Kenya (Hossain et al., 2022; Nakasone et al., 2024). However, these studies are mostly confined to a limited scope of economic performance, investment or growth of firms, without radical exploration of other facets of rural welfare.

Such a limited perspective is dangerous since the livelihoods in the rural areas are multidimensional in nature. Increases in both income and capital will not necessarily lead to better social networks, longer-lasting knowledge acquisition, or more permanent stewardship of natural resources. An example is a farmer who buys a new tool and does not have the technical knowledge to effectively make use of it or a household who earns more money in the short run and ends up reducing the soil fertility. Studies which are informed by the Sustainable Livelihoods Approach highlight that human, social, financial and natural capitals are interacting to both create vulnerability and help in resilience (Carney, 1998; Scoones, 2015). Empirical research testing the multidimensional impacts of agricultural support interventions especially those that link finance and training are however uncommon.

The implication of such evidence gap is eminent. When the programs are measured based on economic outputs and nothing to do with overall livelihood outcomes, then the policy makers may tend to overestimate the value added by finances and undervalue the contribution made by skills, knowledge and ecological custodianship in long term well-being. Absence of systematic evidence on these dimensions would mean that future interventions are designed in ways that are similar to flaws in the past, which would strengthen short-run benefits without creating long-term resilience. In Zambia, where national policy focuses not only on agricultural productivity, but also on sustainable rural development(Chisha & Togo, 2023; Malesu et al., 2025), this kind of oversight restricts the capacity to develop more comprehensive support mechanisms that are responsive to the realities that farmers face.

To address this gap, this study investigates how participation in a training-linked matching grant program relates to multiple dimensions of livelihood capital among smallholder farmers in Chipili District. In contrast to other studies that focus on limited economic indicators, the given analysis relies

on the Sustainable Livelihoods Approach and considers the differences in human, social, financial, and natural capital of the beneficiaries and a similar group of non-beneficiaries and takes into consideration individual socioeconomic features.

1.1 Objective

The study has two main objectives:

I. To assess differences in human, social, financial, and natural capital between farmers who received the matching grant and those who did not.
II. To evaluate whether associations between matching grant participation and livelihood capitals persist after accounting for key socioeconomic factors (age, education, gender, farm size, household size, and farming experience).

2. Literature review

2.1. Theoretical Review

The livelihoods framework provides the conceptual backdrop. As DFID (1999) explains, households' livelihood assets fall into five capital categories: human, social, natural, physical, and financial (Chikopela, 2015). Improvements in any capital are expected to enhance well-being. For example, higher human capital (education, skills) can boost productivity; stronger social capital (group membership, trust) can facilitate access to information or credit; abundant natural capital (land, water) supports production; and greater financial capital (savings, income) underlies consumption smoothing or investment. In this study we focus on four capitals (excluding physical); the first objective is to compare those capitals for matching grant vs. non-grant farmers.

Matching grants are defined as a one-off, non-reimbursable transfer to beneficiaries for a specific purpose, conditioned on an equivalent(10%-50%) contribution by the beneficiary(Sberro-Kessler, 2019). They have been widely used by agencies like IFAD and the World Bank to fund farm machinery, inputs, or joint projects (e.g. cooperatives)(Sberro-Kessler, 2019). The rationale is that, in credit-constrained rural areas, farmers might not invest even profitable opportunities due to lack of capital or high interest costs; matching grants can "unlock" investments and stimulate growth(Sberro-Kessler, 2019). However, experts caution that grants are often implemented where markets are weak, and may not build lasting linkages to formal finance(Sberro-Kessler, 2019). For instance, Campos et al. (2012) conclude that while grants are intended to raise incomes and foster relationships with banks, in practice few durable financial market linkages materialize, and grants alone rarely produce broad, sustained benefits(Sberro-Kessler, 2019; Walters, 2025). In sum, theory suggests matching grants could increase financial and physical capital (by enabling purchases of assets), and perhaps human capital (if training accompanies grants) or social capital (if grants involve group projects), but evidence is mixed and limited(Bardhi, 2016; Kabengele, 2015; Sberro-Kessler, 2019).

2.2 Financial Capital and Productivity

In Africa, evidence indicates that matching grants have the capacity to increase smallholder financial capital in terms of increased income, profit, and assets. In Rwanda, Hossain et al. (2022) adopt a fuzzy regression discontinuity design and conclude that matching loan endorsement has substantial effects

on horticultural and total income, wage income, employment, and durable and livestock assets, and lasting gains can be observed many years after the implementation of the program. The findings are however applicable to commercialized businesses that were close to the eligibility cut-off and other livelihood capitals were not evaluated.

In Zambia, Kabengele (2015) cites the example of IFAD beneficiaries of SAPP matching grants as having a higher productivity and profitability than clients of microcredit, which may be ascribed to the fact that grants had no interest attached to it whereas loans had repayment obligations. However, the research is a descriptive and non-random study subjected to self-selection, a narrow geographic study area, and the use of recollection, thus it is unable to uncover the cause-and-effect relationship between grants and no support.

These findings are refined by microfinance studies where, Copestake et al. (2001) find repeat borrowers gained in profits and income, but many first-time borrowers performed worse due to rigid group enforcement, illustrating how debt burdens can offset benefits. Although it is not concerned directly with grants, this underscores the possible benefit of matching grants in preventing indebtedness, and the necessity of more robust evaluation designs

2.3 Human and Social Capital

In addition to incomes and assets, one way that matching grants can affect human capital (knowledge, skills, health) is through training or extension. Financial aid in most agribusiness support programmes is accompanied by capacity-building aspects, thus addressing not only capital limitations but also knowledge and management gaps. There is evidence to show that these combined interventions can enhance business practices and technology adoption by beneficiaries. As an example, evidence from Burkina Faso shows that matching and cash grant programs that combine financial support with training and consulting services can improve business practices and firm performance in fragile contexts(Grimm et al., 2024). Similarly, Karlan et al. (2014) demonstrate that the use of complementary support interventions may promote the adoption of better agricultural practices which imply the improvements of technical knowledge and decision-making ability.

Nevertheless, the majority of assessments focus on income and asset results, and seldom directly assess knowledge or acquisition of skills. As a result, there is a significant literature gap whereby evidence of human capital improvement is most likely to be inferred based on behavioral changes and not quantified systematically.

In terms of social capital, the literature suggests that, membership of social networks or cooperatives aid the farmers to access information and resources. As an example, Manda estimates with panel data in Zambia that cooperative membership raises the likelihood of adopting better maize varieties, fertilizer, and crop rotation by 1124 percentage points, and members adopt new maize technologies 1.64.3 years earlier than non-members. To further supplement this view of technology-adoption, Mundia et al. (2023), in a case-study on the cooperatives in Kabwe District, discover that a 1-percentile increase in household income was significantly due to accessibility to subsidized inputs, credit and higher yields although cooperative training and social capital had no statistically significant impact on household income. This highlights the role of groups (social capital) in diffusion of technology and, ostensibly, improved livelihoods. Still, even the matching grant studies do not directly study social

capital. It is possible that grant programs (which are frequently provided in groups or associations) might enhance communal bonds, but we have no empirical results on whether comparable grants enhance cooperative membership, trust or knowledge networks in Zambia. Group lending (microcredit) in the Kabengele (2015) study, for example was based on social collateral but on a more individual basis or to businesses. The IFAD report states that 52.3 per cent of match-grant farmers were women (IFAD, 2022), which perhaps confirms gendered networks or targeting, but once again, social capital dynamics are uninvestigated.

2.4 Natural Capital and Environmental Outcomes

Smallholder agriculture and rural well-being are supported by natural capital such as healthy soil, dependable water, intact biodiversity, and sustainable land use. One is that matching grants programs tend to target productivity and value addition, rather than conservation per se. Although, empirical research has consistently established that, the better a household is able to access natural resources, the higher the incomes and assets of the household. As an example, the study of rural Madagascar indicates that the regions with more proximate natural resources (volumetrically measured through vegetation greenness) are correlated with much greater financial, human, and social capital among locals (Nawrotzki et al., 2012). As a matter of fact, access to forests, water and other natural resources becomes one of the key livelihood strategies, particularly among the poor. In 2025, Zambia introduced the Zambia Agroforestry, Biodiversity and Climate (Z4ABC) matching-grant program to fund sustainable value chains. Small businesses and cooperatives operating in bamboo, wild mushrooms, legumes, non-timber forest products and ecotourism can also receive grants under Z4ABC (beneficiaries contribute a portion of the costs) to implement climate-smart technologies. It aims to design green jobs and livelihoods and assist in restoring ecosystems. The Z4ABC program specifically connects grants to such results as biodiversity conservation and climate resilience. Its launch statement focuses on investments that build sustainable livelihoods and contribute to restoring ecosystems as well as supporting climate and NDC (reductions) in Zambia.

Cash- or in-kind transfer programs associated with conservation have also been evaluated in research programs. One of the examples was a large study in Sierra Leone (100 villages) that compared the effects of conditional transfers (conditional on forest preservation) versus unconditional transfers on livelihoods and forest use. Some preliminary results of such initiatives have indicated that sustainable incentives can preserve the presence of forests without negatively affecting the livelihood of households (Early findings of such work). Equally, ecosystem services pilots (e.g. watershed payments in highlands) in some African countries have started demonstrating that farmer payments to protect soil and trees can enhance water quality and flow, and also income of farmers (Wilebore et al., 2019).

The overall lesson in all these instances is that finance and incentives do count. Farmers are more likely to implement measures that can enhance environmental performance by creating natural capital (terracing, agroforestry, buffer strips, etc.) when they are supported based on sustainable practices. Sustainable investments become both financially viable with matching grants, and research such as the one conducted in Rwanda demonstrates that the investments result in increased earnings and resilience (Hossain et al., 2022). Likewise, a more explicit goal of biodiversity (as in Z4ABC) is consistent with the interests of the private profit, so that increasing natural wealth and increasing incomes are mutually reinforcing.

2.5 Controlling for Socioeconomic Factors

Hossain et al. (2022) study effectively manage all pre-treatment covariates in Rwanda by its regression discontinuity design, which maintains comparability between endorsed and non-endorsed firms around the cutoff. They do not give the coefficient estimates separately based on age or education, but the RD approach implicitly equalizes observed factors. Beyond experiments, other studies propose that socioeconomics has a strong influence on capital outcomes. For instance, Kehinde (2025) examines the accessibility of different livelihood capitals by smallholders in Nigeria. He estimates using a multivariate probit that education and membership of an association and farm size are strong predictors of access to financial capital, whereas age, education and farm experience are important predictors of human capital. On the same note, natural capital access is driven by farm size and income, and social capital is driven by household size and primary occupation. Kehinde then demonstrates through a fractional regression that despite the control of demographics, access to these capitals has a significant impact on the decisions made on land-use. The implication is that factors like age, gender, farm size, etc. are confounders: this is because, unless they are controlled, it will be easy to erroneously attribute, say, higher income to receipt of grants when part of it is due to the larger land holdings or better education of the farmers.

In Zambia in particular, rigorous studies controlling such are minimal. The comparison between grant and loan made by Kabengele (2015) did not provide a statistical control on the characteristics of farmers. The IFAD supervision mission gathered certain disaggregated information (e.g. observing gender ratios, but again this was not intended to analyze impact, but to monitor it. Anecdotally, there have been efforts in Zambia to match grant programs with the inclusion of the youth and women (the 52.3% women in E-SAPP was way beyond the 30% target). However, the gender results are not published. The literature of poverty and livelihoods tends to conclude that younger, better-educated farmers are more easily adopting new practices. In case the grant recipients are older or more educated as compared to the non-recipients, it might be considered as a bias in using simple comparisons. Therefore, one of the gaps in research is systematic evidence on whether matching grant effects are obtained when socioeconomic status is incorporated in the model. The second objective of the current study fills this gap by explicitly controlling age, education, gender, farm/household size, and experience, which may not have been used in previous matching-grant studies in Zambia.

2.6 Synthesis: Patterns, Contradictions, and Gaps

According to literature, generally matching grants can boost smallholder financial capital by increasing incomes, assets, and technology take up as reported in Rwanda, Zambia, and IFAD monitoring studies. The same increase is observed in microcredit studies implying that access to capital can ignite growth when well utilized. Nevertheless, Campos warns that most grant projects fail to provide sustainable impacts, which casts doubts on sustainability in the long run and differences across studies with regard to methods.

Limited evidence on human and social capital exists. Technology adoption can signify learning, yet the number of studies that measure changes in human capital directly and provide clear counterfactuals are limited. Social capital is also under-analyzed, and there is little evidence of grant participation driving

networking changes, and that this may be biased because more highly connected farmers have more likelihood of getting grants.

In general, significant gaps remain: none of the studies quantify all four capitals of livelihood holistically, most of the impact of natural capital is not considered, and socioeconomic controls are not commonly imposed. Strict assessment designs like RCTs are limited in both Zambia and abroad, and the conditional impacts of grants are still unclear. The literature contradicts this by suggesting that grants can be effective with high targeting and support, and that comparisons with microcredit are still open to further investigation. Financial outcomes are not the only aspect of matching grants that have been found to do well, but there exists a lack of evidence on other aspects of improving financial capital by use of higher income and technology uptake. The impacts of human, social, and natural capital are not often quantified, and most studies are not sufficiently controlled, which questions the idea of sustainability and attribution. This study fills these gaps by providing a controlled, multidimensional assessment of a Zambian matching grant program across four livelihood capitals.

3.0 Methodology

3.1 Study Design

This study employed a quantitative research design to examine the effects of training-linked matching grants on the multidimensional livelihoods of smallholder farmers in Zambia. A quantitative approach was selected because it allows systematic measurement and comparison of human, social, financial, and natural capital between farmers who received the matching grant and those who did not. By generating numerical data, this design enables rigorous statistical testing of differences and relationships, providing clear evidence of associations and effect sizes. The approach aligns directly with the study's objectives, offering objectivity, replicability, and the ability to draw conclusions grounded in measurable outcomes(Creswell & Plano Clark, 2023).

3.2 Study Setting and Time Frame

The study was conducted in Chipili District, Northern Province, a predominantly rural area where smallholder farming is the main livelihood activity. Chipili was chosen because it actively participates in the matching grant programme and has well-established cooperative networks that facilitate collective agricultural activities. Data collection occurred over three months, from March to May 2025, which corresponds to the post-implementation phase of the matching grant programme. This timing ensured that farmers had sufficient exposure to the training components of the grant while minimizing recall bias in self-reported measures. The cooperative-based and rural setting provided an appropriate context for assessing the multidimensional effects of the intervention.

3.3 Population and Sampling

The target population was smallholder farmers who were beneficiary and non-beneficiaries of a matching grant programme in Chipili district. Simple random sampling was used to sample both beneficiaries and a similar group of non-beneficiaries and therefore a total of 352 participants were obtained 240 beneficiaries and 112 non-beneficiaries. The formula of Yamane was used to calculate sample size with 5 percent margin of error, which was adequate to provide statistical power to identify meaningful differences (Yamane, 1967).

3.4 Data Collection

Structured questionnaires were used to collect data on each livelihood capital. The indicators of human capital were knowledge of farming techniques, use of innovations and farm management skills. The measurement of social capital was done through involvement in cooperative activities, peer networking, and access to information. Financial capital seized access to the financial resources, financial balance, and contentment of pay out whereas natural capital emphasized on the land quality, availability of resources and the sustainable management practices. To make sure the questionnaire was clear and culturally relevant and reliable, a small group of farmers outside the study area was used to pretest the questionnaire.

3.5 Data Analysis

Descriptive statistics, independent-samples t-tests and ordinary least squares regression were used to analyze the data. The differences between beneficiaries and non-beneficiaries were summarized using descriptive statistics. T-tests were used to test the significance of differences in the means of each capital, and the regression models were used to estimate the strength and significance of the relationships between grant participation and livelihood outcomes. We conducted all analyses using SPSS and therefore ensured rigor and reproducibility.

The methodology has a solid base in assessment of the multidimensional effects of training-linked matching grants by means of a purposive quantitative design, structured measurement, and strong statistical analysis to produce actionable evidence to guide policy and programme design.

4. Results

4.1 Socioeconomic Characteristics of Respondents

Table 4.1 summarizes the socioeconomic profile of the 352 farmers in Chipili District, stratified by grant receipt.

Table 4.1. summarizes the socioeconomic

Characteristic	Category	Beneficiaries (N=240)	Non-Beneficiaries (N=112)	Total (N=352)	χ^2 (p-value)
Age (years)	Under 30	59 (24.6%)	18 (16.1%)	77 (21.9%)	11.39 (0.010)
	30–39	61 (25.4%)	35 (31.3%)	96 (27.3%)	
	40–49	98 (40.8%)	37 (33.0%)	135 (38.4%)	
	50+	22 (9.2%)	22 (19.6%)	44 (12.5%)	
Gender	Male	147 (61.3%)	74 (66.0%)	221 (62.8%)	0.76 (0.383)
	Female	93 (38.8%)	38 (33.9%)	131 (37.2%)	
Education	No formal	63 (26.3%)	9 (8.0%)	72 (20.5%)	23.63 (<0.001)
	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%)	
Main Farming Activity	Crops	188 (78.3%)	104 (92.9%)	292 (82.9%)	34.47 (<0.001)
	Livestock	0 (0%)	6 (5.4%)	6 (1.7%)	
	Mixed	52 (21.7%)	2 (1.8%)	54 (15.3%)	
Household Size	1–2	15 (6.3%)	2 (1.8%)	17 (4.8%)	4.16 (0.245)
	3–5	115 (47.9%)	61 (54.5%)	176 (50.0%)	
	6–8	93 (38.8%)	43 (38.4%)	136 (38.6%)	
	>8	17 (7.1%)	6 (5.4%)	23 (6.5%)	
Farm Size (ha)	<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%)	

Source: Authors research

Matching Grant beneficiaries tend to be younger, have lower formal education levels, and are more likely to engage in mixed farming compared with non-beneficiaries. Household size and gender distribution were similar across groups. These characteristics provide context for observed differences in livelihood outcomes and will be accounted for in regression analyses.

4.2 Reliability of Livelihood-Capital Scales

Internal consistency of the four livelihood-capital indices was assessed using Cronbach's alpha (α) and average inter-item correlations. Results are in Table 4.2.

Table 4.2. Reliability of Livelihood Capital Scales

Livelihood Capital	Meaning of Capital	Number of Items (k)	Mean Inter-Item Correlation	Cronbach's α
Human Capital	Farmers' knowledge and skills, adoption of innovations, and farm management capacity	4	0.756	0.925
Social Capital	Community engagement, peer networking, access to information, and social support	4	0.339	0.672
Financial Capital	Access to financial resources, income stability, financial services, and satisfaction with returns	4	0.525	0.815
Natural Capital	Land quality, resource availability, resource condition, and sustainable management	4	0.338	0.672

Cronbach alpha and mean inter-item were used to measure internal consistency reliability. The scores of the results suggest high reliability of Human Capital (= 0.925) and acceptable reliability of Financial Capital (= 0.815). The internal consistent of Social Capital (0.672) and Natural Capital (0.672) was moderate. Despite the fact that these later values are slightly lower than the traditional 0.70 standard, coefficients of reliability that are greater than 0.60 are regarded as acceptable in exploratory and applied field research, especially when the constructs are multidimensional and assessed with a moderate number of items (Hair et al., 2019).

4.3 Livelihood Capitals by Grant Status

Table 4.3 presents mean scores and standard deviations of the four livelihood-capital dimensions, stratified by grant receipt.

Table 4.3: Descriptive Statistics and Cohen's d

Livelihood Capitals	Non-Beneficiaries M (SD)	Beneficiaries M (SD)	Mean Difference	Cohen's d
Human	2.87 (0.29)	3.43 (0.91)	0.57	0.77
Social	3.27 (0.17)	3.56 (0.91)	0.29	0.41
Financial	2.03 (0.18)	2.53 (0.82)	0.51	0.73
Natural	3.47 (0.54)	3.82 (0.42)	0.35	0.7

Note. M = mean; SD = standard deviation; Cohen's d indicates effect size, where 0.2 = small, 0.5 = medium, and 0.8 = large effect (Cohen, 1988).

The scores of the four capitals are higher among beneficiaries. The effect sizes denote that the differences between human, financial, and natural capital are medium and large, and that between social capital is minor to moderate, indicating that there is meaningful association between grant participation and multidimensional livelihood gains.

4.4 Independent-Samples T-Tests

Independent samples t-tests confirm the differences observed in means (Table 4.4). Equal variances were assumed based on preliminary Levene's tests.

Table 4.4. t-Tests for Livelihood Capital Differences

Livelihood Capitals	t	Df	p	95% CI
Human	–6.42	350	<0.001	[–0.74, –0.39]
Social	–3.30	350	0.001	[–0.46, –0.12]
Financial	–6.46	350	<0.001	[–0.66, –0.35]
Natural	–6.59	350	<0.001	[–0.45, –0.24]

All differences are statistically significant. Beneficiaries consistently report higher livelihood-capital scores than non-beneficiaries.

4.5 Regression Analysis

Table 4.5 presents adjusted OLS estimates testing the relationship between matching grants receipt and each livelihood capital adjusting age, education, gender, farm size, household size and farming experience. In all the models, there is a positive and statistically significant relationship between grant participation and livelihood outcomes.

Table 4.5. Adjusted OLS Regressions of Livelihood Capitals on Grant Receipt

Livelihood Capitals	b	SE	t	p	R^2
Human	0.45	0.06	7.5	<0.001	0.21
Social	0.22	0.06	3.67	<0.001	0.12
Financial	0.42	0.05	8.4	<0.001	0.23
Natural	0.28	0.05	5.6	<0.001	0.19

Human capital (b = 0.45, SE = 0.06, t = 7.50, p < 0.001, R 2 = 0.21) and financial capital (b = 0.42, SE = 0.05, t = 8.40, p < 0.001, R 2 = 0.23) are associated most strongly. Controlled by socioeconomic characteristics, beneficiaries are rated on average four-tenths of a point higher on these scales than non-beneficiaries, signifying huge increases in knowledge, skills, and financial abilities. The higher values of the R 2 indicate that these models describe a significant percentage of the variation in these capitals.

Natural capital also demonstrates a positive relationship with grant receipt (b = 0.28, SE = 0.05, t = 5.60, p < 0.001, R 2 = 0.19), which means that beneficiaries have better land management and more favorable resources. The correlation to the social capital though lower in magnitude is significant statistically (b = 0.22, SE = 0.06, t = 3.67, p < 0.001, R 2 = 0.12) indicating the enhanced ties and collaborative interactions.

Notably, the fact that the effects of these remain even after the adjustment implies that the difference in the observed cases cannot be explained by demographic and structural factors alone. Rather,

matching grant participation is consistently associated with multidimensional improvements across livelihood capitals, with particularly pronounced effects on human and financial assets.

5. Discussion

This study aimed to examine whether participation in a training-based matching grant programme is associated with differences in human, social, financial, and natural capital among smallholder farmers Chipili District in Zambia. The results indicate that there are significant and statistically significant differences between grant recipients and non-recipients in various dimensions of livelihood. It is worth noting that these variations remain robust despite the adjustments of age, education, gender and size of farm, household size and experience of farming. Collectively, the findings indicate that the positive gains are not merely a manifestation of prior benefits among beneficiaries, but they are likely to be associated with the matching grant training program itself.

5.1 Financial Capital and Economic Outcomes

The positive correlation between matching grant participation and financial capital is in line with much of the available literature on matching grants in agriculture. The study conducted in Rwanda indicates that matching grants can help significantly boost enterprise income, asset accumulation, and creation of employment (Hossain et al., 2022). On the same note, a comparative study conducted in Mazabuka district of Zambia established that the productivity and profitability of farmers who received equivalent grants was higher than farmers who used microcredit (Kabengele, 2015). This study supports this trend, indicating that matching grants especially when coupled with training can leads to the increase of income stability and productive investment capacity among farmers.

Nevertheless, the study builds on existing literature in two significant aspects. One, it provides evidence of the persistence of financial gains even after adjusting to structural differences among farmers by including socioeconomic controls. Most previous researchers either utilized descriptive comparisons or failed to adequately address demographic confounders. Second, financial gains that are witnessed in this case are seemingly tightly coupled with increases in human capital and social capital meaning that the effect of income may not be a direct result of capital investment but rather as a consequence of increased knowledge and network participation. These finding challenges narrower interpretations that view matching grants primarily as financial instruments and supports arguments that complementary capacity-building is critical for sustained impact (Campos et al., 2014).

In the light view of Sustainable Livelihoods Approach (SLA) the financial capital gains recorded in this research advance the thesis statement that targeted asset support can lead to increased livelihood resilience (DFID, 1999). However, the findings also indicate that the financial capital does not work in isolation. Instead, it is entrenched in a larger system of mutually reinforcing capitals, which strengthens the multidimensional logic of the SLA framework.

5.2 Human Capital and Capability Expansion

One of the most pronounced differences between beneficiaries and non-beneficiaries was observed in human capital Recipients of Matching Grant also indicated better skills acquisition, better farm management practices and even better adoption of innovations. These results are in line with monitoring reports of training-related agricultural programs in Zambia, which have reported high

adoption rates after organized farmer education programs ((Hamazakaza et al., 2022; WorldBank, 2019). They are also consistent with more general evidence that training increases the technical efficiency and productivity of farmers.

The key attribute that comes out in this study is the focus on training in the grant model. The programme incorporated knowledge transfer in the intervention instead of giving a financial support. This seems to have enhanced the ability of farmers to transform their resources into better results. Theoretically, this observation directly relates to the Capability Approach(Sen, 1993). The expansion of human capital is not just an indication of an increase in resource supply, but also the expansion of real freedoms of farmers their right to make well-informed decisions, use better technologies, and take risks.

In this regard, these findings are in line with the argument that development interventions could be evaluated not only based on resource allocation but also based on the progress in terms of improving agency. Farmers did not just get inputs but they developed skills through which they were able to use the inputs more efficiently. This provides empirical evidence on the Capability Approach as a complementary model to SLA and proves that there will be improvements in the stocks of assets that need to be explained with the improvement of the ability of individuals to utilize those assets.

5.3 Social Capital and Collective Dynamics

Significant differences in social capital between recipients and non-recipients were also found in the study. Beneficiaries were more engaged in cooperation, more trustful in farmer networks and more successful in information exchange. This observation is consistent with studies that revealed cooperative membership to speed up the uptake of technology and reinforcement of agricultural performance in Zambia(Manda et al., 2020).

At the same time, the findings contribute to the literature. Although past research tends to propose social capital as an antecedent state that promotes access to interventions, the current study proposes that the engagement in a matching grant through cooperative could stabilize social connections itself. This two-way relationship in which the social capital facilitates and is reinforced by intervention involvement may be a new contribution. It questions linear models that social capital is an input variable and instead places it in the position of an outcome and means.

In the SLA terms, the results indicate interconnectedness of capitals. Improved social capital probably enabled sharing of knowledge (human capital) and synchronized investment decision-making (financial capital). The Capability Approach also sheds more light on this dynamic by setting the social participation as a desirable functioning in its own right. Empowered networks can help increase the freedom of farmers to cooperate, bargain and gain market capabilities that are not short-term income outcomes.

5.4 Natural Capital and Sustainability

Matching grants participation was also linked to improvements in natural capital especially sustainable land and resources management practices. The latter result is important considering that the environmental dimensions are very often under-explored in the matching grants assessment. Although there has been some research on the relationship between agricultural support programs and better climate-smart practices, the empirical research has not been carried out systematically. The current findings indicate that grants associated with training can be used to promote more sustainable

utilization of resources, perhaps through the addition of environmental stewardship in technical training.

This aspect supports the sustainability assertion underlying the SLA framework. Livelihood resilience does not rely on the basis of income growth, but also on the conservation and maximization of natural resource foundations. The improvements that were observed show that the intervention can lead to long-term viability as opposed to short-term productivity. Nevertheless, it is yet to be determined on how these environmental practices will be sustained in the long term in the absence of longitudinal data.

6. Conclusions

6.1. Conclusion

This study examined whether participation in a training-based matching grant programme is associated with multidimensional livelihood improvements among smallholder farmers in Zambia. The analysis compared beneficiaries and non-beneficiaries in terms of human and social capital, financial capital, and natural capital. The results indicate that grant recipients consistently demonstrate stronger outcomes across all four dimensions. The beneficiaries noted improved skills and application of knowledge, increased participation in cooperative networks, better income stability and ability to invest productively and increased adoption of sustainable land and resource management practices. These results suggest that training-linked matching grants are associated with broad-based livelihood strengthening rather than narrowly defined financial gains.

The results support the conceptual framework of the Sustainable Livelihoods Approach by demonstrating that changes happen in the interconnected capitals, but not in isolation. The enhancement in human and social capital has been found to be beneficial in promoting changes in financial and natural capital, which highlights how livelihood transformation is systemic.

At the same time, the results in line with the Capability Approach, as they indicate that the intervention expanded farmers' practical opportunities their ability to apply knowledge, collaborate, and make informed production decisions. The programme's contribution therefore lies not only in asset provision but also in enhancing farmers' capacity to convert resources into valued outcomes.

6.2 Recommendation

Based on the findings it is recommended that, the Ministry of Agriculture and the implementing agencies need to expand the programme so that more farmers and cooperatives can benefit. Cooperative leaders and extension officers should actively encourage farmers to work together and share knowledge, as this can help build stronger and more supportive networks. programme coordinators and researchers should consider conducting impact evaluation five years after the matching grant programme end to track changes in skills, income, and farming practices over time to ensure that the benefits are sustained. Furthermore, the research and monitoring units are encouraged to keep evaluating human, social, financial, and natural capital to get a comprehensive insight into the overall impact of the programme. These measures may contribute to the increased effectiveness and sustainability of the matching grants in the long term.

6.3 Limitations

This study has some limitations despite its strengths. Firstly, because it uses a cross-sectional design, it cannot show cause and effect, and factors like motivation or business skills may have influenced both participation and reported outcomes. Secondly, using self-reported data also raises the risk that farmers may overstate improvements due to wanting to give good answers or forgetting details. Finally, focusing on just one districts, not measuring physical assets directly, and lacking long-term data makes it hard to know if the results apply elsewhere or will last over time.

References

1. Bardhi, R. (2016). The matching grants instrument: An effective way for rural development. *European Journal of Physical and Agricultural Sciences Vol*, *4*(2). https://www.idpublications.org/wp-content/uploads/2016/03/Full-Paper-THE-MATCHING-GRANTS-INSTRUMENT-AN-EFFECTIVE-WAY-FOR-RURAL-DEVELOPMENT.pdf
2. Barrett, C. B., Carter, M. R., & Little, P. D. (2006). Understanding and reducing persistent poverty in Africa: Introduction to a special issue. *The Journal of Development Studies*, *42*(2), 167-177. https://doi.org/10.1080/00220380500404587
3. Campos, F., Coville, A., Fernandes, A. M., Goldstein, M., & McKenzie, D. (2014). Learning from the experiments that never happened: Lessons from trying to conduct randomized evaluations of matching grant programs in Africa. *Journal of the Japanese and International Economies*, *33*, 4-24. https://doi.org/10.1016/j.jjie.2013.12.007
4. Carney, D. (1998). Sustainable livelihoods. *Sustainable Livelihoods: What contribution can we make*, 18-33.
5. Chikopela, J. (2015). *Livelihood strategies of small-scale farmers in Nankanga camp of Kafue district, Zambia* [Masters thesis, http://dspace.unza.zm/handle/123456789/3703
6. Chisha, N., & Togo, M. (2023). A Review of The National Agricultural Policy of Zambia and Its Alignment with Sustainable Agricultural Practices: A Case Study of Kasisi Agricultural Training Centre. *Malaysian Journal of Sustainable Agricultural*, *7*(1), 38. https://doi.org/10.26480
7. Copestake, J., Bhalotra, S., & Johnson, S. (2001). Assessing the impact of microcredit: A Zambian case study. *Journal of Development Studies*, *37*(4), 81-100. https://doi.org/10.1080/00220380412331322051
8. Creswell, J. W., & Plano Clark, V. (2023). Revisiting mixed methods research designs twenty years later. *Handbook of mixed methods research designs*, *1*(1), 21-36.
9. Fallas Conejo, D., & Sánchez, M. (2024). Leveraging remittance-based matching grants for investing in agribusiness development. https://doi.org/10.4060/cd2427en
10. Grimm, M., Soubeiga, S., & Weber, M. (2024). Supporting small firms in a fragile context: Comparing matching and cash grants in Burkina Faso. *Journal of Development Economics*, *171*, 103344. https://doi.org/10.1016/j.jdeveco.2024.103344
11. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, *31*(1), 2-24.
12. Hamazakaza, P., Kabwe, G., Kuntashula, E., Egeru, A., & Asiimwe, R. (2022). Adoption of sustainable agriculture intensification in maize-based farming systems of Katete district in Zambia. *Land*, *11*(6), 880. https://doi.org/10.3390/land11060880

13. Hossain, M., Mabiso, A., & Garbero, A. (2022). Matching grants and economic activities among horticultural entrepreneurs: Long-term evidence from Rwanda. *World Development*, *150*, 105712. https://doi.org/10.1016/j.worlddev.2021.105712
14. IFAD. (2022). *Enhanced smallholder agribusiness promotion programme: Supervision report*.
15. Kabengele, G. (2015). *Comparative assessment of matching grants and microcredit interventions in improving livelihood of peasant farmer in Mazabuka District, Zambia* [Master's Thesis, University of Cape Town]. http://hdl.handle.net/11427/28989
16. Karlan, D., Osei, R., Osei-Akoto, I., & Udry, C. (2014). Agricultural decisions after relaxing credit and risk constraints. *The Quarterly Journal of Economics*, *129*(2), 597-652. https://doi.org/10.1093/qje/qju002
17. Kehinde, A. (2025). Unlocking access to livelihood capitals and its impact on land allocation decisions among smallholder farmers in Nigeria. *Sustainable Futures*, *10*, 101040.
18. Lungu, G., Uwimbabazi, A., Umer, Y., Abdi, E., Chipando, G., Mensah, G. B., Kayusi, F., Adame, A. A., & Chavula, P. (2024). Zambia's Paradox: National Food Security Amidst Household-Level Food Insecurity. *South Asian Res J Agri Fish*, *6*(6), 127-136. https://doi.org/10.36346/sarjaf.2024.v06i06.005
19. Malesu, M. L., Syrovátka, P., & Chisale, S. W. (2025). Prioritizing critical success factors for smallholder maize farmers in Zambia: A Pathway to Sustainable Food Security and Rural Development. *Sustainable Development*, *33*, 1038-1058. https://doi.org/10.1002/sd.70038
20. Manda, J., Khonje, M. G., Alene, A. D., Tufa, A. H., Abdoulaye, T., Mutenje, M., Setimela, P., & Manyong, V. (2020). Does cooperative membership increase and accelerate agricultural technology adoption? Empirical evidence from Zambia. *Technological forecasting and social change*, *158*, 120160. https://doi.org/10.1016/j.techfore.2020.120160
21. Mundia, M., Nkonde, C., Simui, F., Mufalali, M. S., & Muduli, R. (2023). Cooperatives and livelihood improvement: understanding the contribution of enterprising agriculture cooperatives in rural communities of Kabwe District, Zambia. *European Journal of Agriculture and Food Sciences*, *5*(2), 40-46. https://doi.org/https://doi.org/10.24018/ejfood.2023.5.2.655
22. Nakasone, E., Porter, M., Maredia, M. K., Jones, A., & Tschirley, D. (2024). A mixed methods assessment of technical and financial assistance to small-and medium-sized enterprises in Kenya's food sector. *Applied Economic Perspectives and Policy*, *46*(2), 435-455. https://doi.org/10.1002/aepp.13426
23. Nawrotzki, R. J., Hunter, L. M., & Dickinson, T. W. (2012). Rural livelihoods and access to natural capital: Differences between migrants and non-migrants in Madagascar. *Demographic research*, *26*, 10.4054/DemRes. 2012.4026. 4024. https://doi.org/10.4054/DemRes.2012.26.24
24. Ngoma, H., Finn, A., & Kabisa, M. (2024). Climate shocks, vulnerability, resilience and livelihoods in rural Zambia. *Climate and Development*, *16*(6), 490-501. https://doi.org/10.1080/17565529.2023.2246031
25. Sawe, J. R. (2025). Does finance matter in climate change adaptation? Evidence from smallholder farmers' access to informal credits in Hanang District, Tanzania. *Tanzanian Economic Review*, *15*(1), 7. https://doi.org/10.56279/ter.v15i1.217
26. Sberro-Kessler, R. (2019). *How Can Matching Grants in Agriculture Facilitate Access to Finance* (118284). (Lessons Learned from World Bank Group's Experience, Issue. W. Bank. https://hdl.handle.net/10986/33829

27. Scoones, I. (2015). *Sustainable livelihoods and rural development*. Practical Action Publishing. https://doi.org/10.3362/9781780448749
28. Sen, A. (1993). Capability and well-being. *The quality of life*, *30*(1), 270-293.
29. Teschemacher, C., Ng'ombe, T., Fajardo-Steinhäuser, M., & Wani, S. (2023). *What Constrains Agricultural Productivity in Zambia?* https://www.theigc.org/publications/what-constrains-agricultural-productivity-zambia
30. Walters, S. (2025). The Economics of loans and grants and how they contribute to the economics of community. In *Aid Dynamics in Jamaican Development: Empowering Communities through Loans and Grants* (pp. 29-67). Springer. https://doi.org/10.1007/978-3-031-94885-5_2
31. Wilebore, B., Voors, M., Bulte, E. H., Coomes, D., & Kontoleon, A. (2019). Unconditional transfers and tropical forest conservation: Evidence from a randomized control trial in Sierra Leone. *American Journal of Agricultural Economics*, *101*(3), 894-918. https://doi.org/10.1093/ajae/aay105
32. WorldBank. (2019). *Zambian farmers at field school reap benefits of climate-smart agriculture*. World Bank. https://www.worldbank.org/en/news/feature/2019/05/20/zambian-farmers-at-field-school-reap-benefits-of-climate-smart-agriculture?