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Sustainability of donor funded food security projects in Bumula Sub-County, Bungoma County, Kenya

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Abstract

Donors fund several projects that are geared towards food security. However, sustainability is key in ensuring that these projects serve their purpose after the funders cease funding these projects. This study investigated factors influencing the sustainability of donor-funded food security projects in Bumula Sub-County, Kenya. It focused on stakeholder participation, education, training, and funding. Using a descriptive research design, the study surveyed 274 participants from 11 donor-funded projects. Results showed strong positive correlations between all four factors and project sustainability, with stakeholder participation having the strongest influence. Participants reported high levels of involvement across project stages, good agricultural knowledge, well-executed training programs, and effective financial management. Projects were generally perceived as successful, particularly in meeting quality expectations and timelines. However, areas for improvement were identified in budget management and stakeholder satisfaction. The study concludes that a comprehensive approach addressing all four factors, with emphasis on stakeholder involvement, is most effective for ensuring project sustainability. Recommendations include enhancing stakeholder participation in evaluation, bridging technology awareness gaps, optimizing training programs, maintaining strong financial management, and improving budget control measures. These findings provide valuable insights for improving the long-term impact of donor-funded food security initiatives in similar contexts.

Keywords: Agricultural education, Project funding, Project sustainability, Stakeholder participation, Training.

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Contents

Contribution of this paper to the literature
This study analyzes factors influencing sustainability in donor-funded food security projects in rural Kenya. It examines stakeholder participation, education, training, and funding simultaneously, offering a holistic view. Findings emphasize the critical role of stakeholder involvement and effective financial management for long-term success in similar contexts.

1. Introduction

International donors have long supported sub-Saharan African governments in improving their citizens' lives across various sectors, including health, education, food security, and environmental protection. Non-Governmental Organizations (NGOs) implement donor-funded projects aimed at enhancing social justice and empowerment (Kamaara & Ouma, 2018).

In Kenya, development aid has increased significantly, with NGOs receiving Kenya Shillings (KES) 158.7 billion in the 2019/2020 financial year (Annual NGO Sector Report, 2020). Sustainability in donor-funded projects is crucial, defined by Baumgartner and Ebner (2010) as the ability to maintain project goals, results, and products indefinitely. However, donor agencies believe few projects achieve long-term sustainability (Nyakundi & Musembi, 2021).

Kenya's sustainability rating stood at 49% between 2000-2014, lower than neighboring countries like Tanzania (70.1%) and Uganda (59.5%). Okun (2012) notes that project benefits often last for only a short period due to lack of sustainability measures. Stakeholder involvement, particularly community participation, is vital for project success. Bourne (2015) defines stakeholders as people whose support is critically important and whose actions or decisions affect an entity. Successful examples include the camel milk project in Ethiopia, where community participation enabled beneficiaries to own and sustain the project after donors left (Issa, 2018). Similarly, the Mekong Delta Region Urban Upgrading Project in Vietnam succeeded due to serious community consultation (The World Bank, 2020). Conversely, failed projects, such as World Vision's initiative in Malawi, were attributed to a lack of alignment with community needs (Pensulo, 2020).

Adequate funding is essential for project sustainability. Pensulo (2020) highlights how Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) support groups in Malawi closed after donor funding ceased. Wabwoba and Wakhungu (2013) assert that the amount of money allocated to projects directly impacts their longevity, especially in food security initiatives.

Ndegwa (2015) adds that while funding helps projects withstand the test of time, lack of funding makes long-term sustainability difficult. Training in governance, funding functions, and policies is crucial for building organizational capacity and achieving project goals. This was demonstrated in community projects in Nepal, where training contributed to improved outcomes and sustainability. Literacy levels within the community also play a significant role in genuine participation and decision-making.

Mohammed (2018) note that low literacy can result in apparent participation without real influence on project decisions.

In conclusion, the success and sustainability of donor-funded development projects in Africa depend on a complex interplay of factors, including community involvement, adequate funding, training, and literacy levels. By the time donors exit a project, target beneficiaries need to have sustenance and management structures in place to continue running the project, a goal that has not been achieved by most projects in developing countries (Okun, 2012). Addressing these elements holistically can lead to more effective and long-lasting development initiatives.

1.1. Statement of the Problem

Despite proper implementation, over 50% of projects in Sub-Saharan Africa fail (Ika, 2012). Food security remains a significant challenge in developing countries, including Kenya. Bungoma County, with a poverty index of 3.79%, is among the top five affected counties.

The Bungoma County Government's 2013 report indicates that out of 2800 km^2 of arable land, 70% is used for food production and 29.9% for cash crops. Land scarcity due to population growth has led to uneconomical land subdivisions, with small farms averaging 1.5 acres and large farms 10 acres. Numerous donor-funded food security projects have been implemented in Bumula Sub-County, including National Agriculture and Livestock Extension Programme (NALEP), National Accelerated Agricultural Inputs Access Program (NAAIAP), New Rice for Africa, and others (Bungoma County Integrated Development plan, 2018-2022). Despite these efforts, 42% of the county's population remains food insecure (County Government of Bungoma, 2013). Given the persistent food insecurity despite multiple interventions, this study aims to investigate factors influencing the sustainability of donor-funded food security projects in Bumula Sub-County. The research seeks to understand why beneficiary communities fail to enjoy long-term benefits after project completion, focusing on identifying key elements that contribute to project sustainability in this context.

1.2. Objectives of the Study

This study sought to achieve the following objectives:

1. To determine how stakeholders' participation influences sustainability of donor funded food security projects in Bumula Sub-County.
2. To assess how education influences sustainability of donor-funded food security projects in Bumula Sub-County.
3. To examine the influence of training on sustainability of donor funded projects in Bumula Sub-County.
4. To assess how the Level of Funding influences sustainability of donor funded food security Projects in Bumula Sub-County.

2. Literature Review

2.1. Theoretical Framework

This study adopted the stakeholder and resource dependency theories which served as the basis for which this study was based on.

2.1.1. Stakeholder Theory

This theory was advanced by Freeman, who introduced the concept in a book he published in 1984 which was titled "Strategic Management: A Stakeholder Approach". Freeman argued that businesses should consider the interests as well as the needs of each and every stakeholder, but not just the shareholders or owners, and that this approach could lead to long-term success and sustainability (Keup, 2022).

To explore the sustainability of projects financed by donors, researchers apply stakeholder theory by prioritizing the interests and requirements of all stakeholders involved in the project. Donor-funded projects usually involve several stakeholders, including the donor organization, implementing organization, local community, and other beneficiaries. To effectively implement stakeholder theory, the project team must start by identifying all stakeholders and engaging with them from the inception of the project. McAbee (2022) contends that in some projects, some stakeholders are usually seen to have more influence or authority over the project compared to others, this in turn has the ability of creating discord and tension among the stakeholder. This theory will address the first objective concerning the involvement of stakeholders as one of the variables that affect sustainability.

2.1.2. Resource Dependency Theory

This theory was advanced by Pfeffer and Salancik (2003). As per this theory, organizations are not capable of producing each and every resource that they need for their operations and thus must rely on the external environment for attainment of their objectives (Pfeffer & Salancik, 2003). The theory assumes that an entity must engage with other players and organizations within their operating environment to be able to acquire resources (Archibald, 2017). The organization that has the resources (labour, capital raw materials) that are relied upon by other players then has power over them. Since donor funded food security projects rely on financial resources from donors this makes them to be highly dependent on the donor.

The theory holds the opinion that organizations are not formations with similar interests, but it views organizations as not having similar interests and formations (Nienhuser, 2008). It only focusses on the relevance of power, structures and process; it does not look at how factors such as costs, efficiency and mergers between firms when looking at their behaviors. The use of the theory on this study will be to address how funding levels affects sustainability of projects that are meant to enhance food security projects. Nevertheless, the stakeholder theory is more anchored to the study.

2.2. Empirical Review

2.2.1. Stakeholders Participation and Sustainability of Donor Funded Food Security Projects

Project success heavily relies on effective stakeholder engagement throughout the project lifecycle. This process, known by various terms like public participation or community involvement, is crucial for including citizens and representatives in decision-making processes that affect their daily lives (Marzouki, Mellouli, & Daniel, 2022). When executed well, stakeholder management fosters collaboration and enhances project sustainability (Habumuremyi & Tarus, 2021). Kimando, Njogu, and Kihoro (2012) recommends engaging stakeholders from project identification through monitoring and evaluation stages. This approach ensures local perspectives are considered and provides a platform for community voices. Stakeholder participation helps establish agreed-upon metrics and actions for project outcomes (Gitonga, 2012).

Ouma and Mburu (2017) studied Kenya's construction industry, showing positive impacts of stakeholder engagement on project execution. However, Ondiek (2016) found that stakeholder contributions to monitoring and evaluation can be limited due to lack of technical expertise. Sulemana, Musah, and Simon (2018) noted that measures restricting community participation in these processes negatively affected project sustainability by reducing transparency and accountability. Onziru and Kimutai (2022) explored the connection between stakeholder participation and sustainability of World Bank-funded projects in Karamoja, Uganda. The study emphasized the critical role of stakeholder involvement in ensuring project sustainability. Overall, effective stakeholder engagement is widely recognized as a key factor in project success and long-term viability.

2.2.2. Education and Sustainability of Donor Funded Food Security Projects

Education is a powerful tool for changing the world, as Nelson Mandela asserted (Nelson Mandela Foundation, 2017). It enables people to learn from history and address current and future challenges, fostering sustainability. UNESCO (2015b) emphasizes that education must contribute to sustainable global development. Hamdan, Andersen, and De Boer (2021) found that lack of formal education can hinder project understanding, affecting sustainability. Literate communities are better equipped to adapt to technological advancements and climate change, promoting food security project sustainability despite environmental shifts (Kapari, Hlophe-Ginindza, Nhamo, & Mpandeli, 2023). Educated community members can make informed decisions about agricultural tools, inputs, and crop selection for optimal harvests (Achichi, Sennuga, Osho-Lagunju, & Alabuja, 2023).

Mohammed (2018) discovered a significant correlation between education and food security project execution. Educated farmers demonstrated improved ability to cope with changing situations, utilize modern farming tools, and add value to their produce. Education empowers communities to navigate complexities in project implementation and sustainability. It enhances adaptability, technological adoption, and decision-making in agricultural practices. As global challenges evolve, education remains crucial for fostering sustainable development and ensuring long-term project success, particularly in food security initiatives.

2.2.3. Training and Sustainability of Donor Funded Food Security Projects

Training is essential for effective project implementation and sustainability. It equips staff with the necessary knowledge and skills to achieve project objectives and avoid errors due to ignorance. While training can be costly, its absence may lead to misguided actions and ineffective implementation. Hacker et al. (2012) emphasize that community training promotes project sustainability by enabling the application of learned lessons post-implementation. Despite sound management strategies, project objectives cannot be accomplished without adequately trained staff (Mondy & Martocchio, 2016). Ogada (2016) found that the level of training is crucial for project sustainability in a study of Safaricom Foundation-funded education projects in Nairobi County.

The Farmers' Field Schools (FFS) approach has proven successful in Kenya, as demonstrated by a Poverty Eradication Network (PEN) study in Kalama Division, which showed increased crop production capacity among trained farmers (Bunyatta, Mureithi, Onyango, & Ngesa, 2006). Similar success has been observed in Tanzania, where FFS has enhanced agricultural technology adoption (Mvena et al., 2013). In Malaysia, trained farmers demonstrated improved farm management skills (Khairul & Kamariah, 2011). These examples highlight the importance of training in various contexts, particularly in agricultural projects. Effective training programs contribute significantly to project success, sustainability, and long-term impact on communities.

2.2.4. Funding and Sustainability of Donor Funded Food Security Projects

Developing countries heavily rely on funds from wealthy nations to improve the livelihoods of their populations and drive economic growth (Qian, 2015). Ochieng (2016) suggests that project managers often focus on completing projects within the set timeline rather than ensuring sufficient funds are available for all related activities. If a project exhausts previously disbursed funds without adhering to donor guidelines, it cannot secure additional funding until proper accounting is done, complicating project implementation. These financial guidelines serve as control measures to ensure spending aligns with donor requirements (Zdunek, 2017). Funding disbursements can sometimes be delayed, causing lapses that impact project activities as well as sustainability (Amaya, 2015).

Many NGOs are highly dependent on donors, leading to sustainability challenges over time (Lango, 2020). Plan International Homabay PU (2014), cited in Ochunga and Awiti (2017) found that Plan International's community development projects often fail to sustain beyond six months after funding ends. This indicates that projects become unsustainable once donors withdraw. Marcelino-Sádaba, González-Jaen, and Pérez-Ezcurdia (2015) note that there is increasing pressure for all stakeholders to incorporate sustainability into their projects.

3. Research Methodology

This study employed a descriptive research design, which Cohen, Manion, and Morrison (2017) defined as a framework for answering research questions. The design aimed to provide information about a phenomenon's what, how, when, and where (Lambert & Lambert, 2012) using survey questionnaires for data collection. The target population consisted of beneficiary farmers, project managers, officers, donor representatives, and group leaders from 11 donor-funded food security projects implemented in Bumula Sub-County by 2021. The sample size (274 in total) was determined using the Yamane (1967) formula, with stratified sampling based on seven wards and simple random sampling within each ward. Purposive sampling was used for key informants. Semi-structured questionnaires served as the main research instrument. Piloting was conducted on a separate population with similar characteristics, as suggested by Kumar (2011) who recommended a 5-10% pilot sample. Validity, defined by Robson (2011) as the accuracy of measurement, was tested using a pilot sample. Data collection involved distributing questionnaires to the sampled population. For analysis, quantitative data was processed using SPSS version 27, employing both descriptive and inferential statistics, while qualitative data was organized thematically and triangulated with quantitative results.

4. Research Findings

4.1. Stakeholder Participation and Sustainability of Donor Funded Food Security Projects

The first objective of the study was to establish the influence of stakeholder participation on the sustainability of donor funded food security projects. The respondents were required to indicate their level of agreement with items measuring stakeholder participation and the results are shown in Table 1.

Table 1. Stakeholder participation.

Parameters	Mean	Std. dev
We were involved in identification of the project	4.31	0.91
We are usually part of the planning team	4.35	0.49
Our opinions are usually taken seriously	4.26	0.96
We provide services for project implementation	4.33	1.04
We developed metrics for monitoring progress	4.10	0.64
We get involved in monitoring progress	4.17	0.99
We evaluate project progress	4.02	0.76
Composite mean	4.22	0.83

The results in Table 1 show that stakeholder participation in the donor-funded projects was generally high, with a composite mean of 4.22 on a 5-point scale and a standard deviation of 0.83. This suggests that stakeholders were significantly involved in various aspects of the project lifecycle. The highest level of agreement was reported for stakeholders being part of the planning team (mean = 4.35, SD = 0.49), closely followed by involvement in project identification (mean = 4.31, SD = 0.91) and providing services for project implementation (mean = 4.33, SD = 1.04). These high scores indicate that stakeholders were actively engaged in the early stages of project development and execution. Stakeholders also reported that their opinions were taken seriously (mean = 4.26, SD = 0.96), suggesting a good level of respect for their input. Involvement in monitoring progress (mean = 4.17, SD = 0.99) and developing metrics for monitoring (mean = 4.10, SD = 0.64) were also rated highly, indicating stakeholder engagement in the

project's ongoing management. The lowest-rated aspect, though still scoring above 4, was stakeholder involvement in evaluating project progress (mean = 4.02, SD = 0.76). While this suggests room for improvement, it still indicates a substantial level of stakeholder participation in project evaluation. Overall, these results indicate that stakeholders were actively involved across all stages of the project lifecycle, from identification and planning to implementation, monitoring, and evaluation. This high level of participation suggests a collaborative approach to project management, which could potentially contribute positively to project sustainability.

4.2. Education and Sustainability of Donor Funded Food Security Projects

The second objective sought to determine the influence of education on sustainability of donor funded food security projects. The results are shown in Table 2.

Table 2. Education.

Parameters	Mean	Std. dev
I have knowledge on the current farming methods	4.10	0.76
I have knowledge on climate change and how it affects agriculture	4.02	1.02
I am aware of new farming technology	3.96	1.32
Agricultural education is necessary	3.99	0.91
Composite mean	4.01	1.00

Table 2 shows that the respondents generally had a positive perception of their agricultural knowledge and education, with a composite mean of 4.01 on a 5-point scale and a standard deviation of 1.00. This suggests that the farmers in the study area had a relatively high level of agricultural awareness and education. The highest-rated item was knowledge of current farming methods (mean = 4.10, SD = 0.76), indicating that respondents felt well-informed about contemporary agricultural practices. This was closely followed by knowledge of climate change and its effects on agriculture (mean = 4.02, SD = 1.02), suggesting a good awareness of environmental factors impacting farming. Respondents also strongly agreed that agricultural education is necessary (mean = 3.99, SD = 0.91), demonstrating an appreciation for the importance of learning in the agricultural sector. The lowest-rated item, though still scoring relatively high, was awareness of new farming technology (mean = 3.96, SD = 1.32). While this indicates a generally good level of technological awareness, the higher standard deviation suggests more variability in responses to this item compared to others. Overall, these results indicate that the respondents had a good level of agricultural knowledge and education, with a particular strength in understanding current farming methods and climate change impacts.

4.3. Training and Sustainability of Donor Funded Food Security Projects

The third objective of the study was to establish the influence of training on sustainability of donor funded food security projects. The results are shown in Table 3.

Table 3. Training.

Parameters	Mean	Std. dev
We receive training on to enhance agricultural productivity	4.21	1.00
We usually have several trainings	4.16	0.68
The content of the trainings are usually geared towards increasing production	4.24	0.92
The training venues are usually okay	4.31	0.73
The training timings are usually okay	4.48	0.76
Composite mean	4.28	0.82

The results in Table 3 show that the respondents had a very positive perception of the training provided in the donor-funded projects, with a high composite mean of 4.28 on a 5-point scale and a standard deviation of 0.8192. This indicates that training was generally well-received and considered effective by the participants. The highest-rated aspect was the timing of the trainings (mean = 4.48, SD = 0.76), suggesting that the scheduling of training sessions was convenient for most participants. This was followed by the suitability of training venues (mean = 4.31, SD = 0.73), indicating that the locations chosen for training were generally appropriate and accessible. Respondents strongly agreed that the content of the trainings was geared towards increasing production (mean = 4.24, SD = 0.92), which aligns well with the goal of enhancing agricultural productivity. They also reported receiving training to enhance agricultural productivity (mean = 4.21, SD = 1.00), confirming that the training programs were focused on practical, productivity-enhancing skills. The frequency of training sessions was also rated positively (mean = 4.16, SD = 0.68), suggesting that participants felt they had adequate opportunities for learning and skill development. Overall, these results indicate that the training component of the donor-funded projects was well-executed, with appropriate timing, venue selection, content relevance, and frequency. The high composite mean suggests that training was a strong and effective aspect of the projects, likely contributing positively to the overall project performance and the enhancement of agricultural productivity among the participants.

4.4. Funding and Sustainability of Donor Funded Food Security Projects

The fourth objective was to determine the influence of funding on the sustainability of donor funded food security projects. The results are shown in Table 4.

The results in Table 4 indicate a highly positive perception of the funding aspects of the donor-funded projects, with a composite mean of 4.28 on a 5-point scale and a standard deviation of 0.84. This suggests that overall, respondents were very satisfied with the funding arrangements and management. The highest-rated aspect was the provision of spending guidelines (mean = 4.48, SD = 0.81), indicating that clear instructions were given on how to utilize the funds.

Table 4. Funding.

Parameters	Mean	Std. dev
These projects are well funded	4.30	1.02
The funds are usually disbursed on time	4.09	0.67
The funds are readily available	4.27	0.95
The funds disbursed are usually enough	4.27	0.73
Spending guidelines are usually provided	4.48	0.81
Composite mean	4.28	0.84

This is crucial for ensuring proper fund management and accountability. Respondents strongly agreed that the projects were well-funded (mean = 4.30, SD = 1.02), suggesting that the overall funding levels were perceived as adequate. They also reported high agreement on the availability of funds (mean = 4.27, SD = 0.95) and the sufficiency of disbursed funds (mean = 4.27, SD = 0.73). These scores indicate that not only were the funds available, but they were also perceived as sufficient for project needs. The timeliness of fund disbursement received the lowest score, though still high (mean = 4.09, SD = 0.67). This suggests that while there might be some room for improvement in the speed of fund release, it was generally not a significant issue. Overall, these results paint a picture of well-managed project funding. The high scores across all parameters indicate that funding was adequate, readily available, sufficiently disbursed, and accompanied by clear spending guidelines. The relatively low standard deviations suggest a consistent experience among respondents. This positive perception of funding aspects likely contributed to the smooth operation and effectiveness of the donor-funded projects.

4.5. Sustainability of Donor Funded Food Security Projects

Respondents were also asked to respond to statement that sought to establish the sustainability of their projects. The findings are shown in Table 5.

Table 5. Sustainability of donor funded food security projects.

Parameters	Mean	Std. dev
Project met time limit	4.37	0.72
Project within budget	3.95	1.25
Project within scope	4.05	0.80
Project meets quality expectation	4.42	0.76
Stakeholder are satisfied with the project	3.95	0.87
Composite mean	4.15	0.88

The results in Table 5 indicate a generally positive perception of the sustainability of donor-funded food security projects, with a composite mean of 4.15 on a 5-point scale and a standard deviation of 0.88. This suggests that overall, the projects were perceived as successful and sustainable across various parameters. The highest-rated aspect was that the projects met quality expectations (mean = 4.42, SD = 0.76), indicating that the outputs or outcomes of the projects were of high standard. This was closely followed by projects meeting time limits (mean = 4.37, SD = 0.72), suggesting that most projects were completed within their scheduled timeframes. Projects staying within scope received a relatively high score (mean = 4.05, SD = 0.80), indicating that the projects generally adhered to their planned objectives and activities without significant deviation. The lowest scores, though still above average, were for projects staying within budget (mean = 3.95, SD = 1.25) and stakeholder satisfaction (mean = 3.95, SD = 0.87). The higher standard deviation for budget adherence suggests more variability in this aspect across projects or respondents. While these scores are still positive, they indicate potential areas for improvement in future projects. Overall, these results suggest that the donor-funded food security projects were largely successful and sustainable. They particularly excelled in meeting quality expectations and time limits. However, there might be room for improvement in budget management and enhancing stakeholder satisfaction. The generally positive scores across all parameters indicate that these projects were well-managed and achieved their intended goals, contributing to food security in the target areas.

4.6. Inferential Statistics

To establish the influence of the independent variables on sustainability of donor funded food security projects, a regression analysis was carried out and the results described as follows:

4.7. Correlation Analysis

A correlation analysis was carried out and the results shown in Table 6.

Table 6. Correlation matrix.

Variable	Project sustainability
Stakeholders' participation (r)	0.773
p-value	0.036
Education (r)	0.463
p-value	0.018
Training (r)	0.618
p-value	0.025
Funding (r)	0.652
p-value	0.031

The results in Table 6 show the correlations between project sustainability and four key factors: stakeholders' participation, education, training, and funding. All correlations are positive and statistically significant ($p < 0.05$),

indicating that each factor has a meaningful relationship with project sustainability. Stakeholders' participation demonstrates the strongest correlation with project sustainability (r = 0.773, p = 0.036). This strong positive relationship suggests that higher levels of stakeholder involvement are associated with greater project sustainability. Funding shows the second strongest correlation (r = 0.652, p = 0.031), indicating that adequate financial resources are also strongly linked to project sustainability. Training exhibits a strong positive correlation with project sustainability (r = 0.618, p = 0.025), implying that effective training programs contribute significantly to the long-term success of projects. Education shows a moderate positive correlation with project sustainability (r = 0.463, p = 0.018). While still significant, this relationship is not as strong as the others, suggesting that educational levels play a role in project sustainability, but perhaps to a lesser extent than the other factors. Overall, these results indicate that all four factors are important contributors to project sustainability, with stakeholders' participation appearing to be the most crucial. The findings suggest that a comprehensive approach addressing all these aspects, but particularly emphasizing stakeholder involvement, could be most effective in ensuring the sustainability of donor-funded food security projects.

4.8. Model Summary

The study sought to determine the fit of the regression equation using the coefficient of determination between the independent variables and sustainability of donor funded food security projects.

Table 7. Model summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.921[a]	0.849	0.845	0.041

Note: [a] Predictors: (Constant), training, stakeholder's participation, education, and funding.

The model summary in Table 7 reveals a strong predictive relationship between project sustainability and the factors of training, stakeholder participation, education, and funding. With an R value of 0.921, the model indicates a very strong positive correlation between these predictors and project sustainability. The R Square of 0.849 suggests that 84.9% of the variance in sustainability can be explained by these factors, demonstrating the model's high explanatory power. The Adjusted R Square of 0.845, being close to the R Square, indicates good generalizability. The low Standard Error of the Estimate (0.04131) suggests accurate predictions. Overall, this model provides a robust framework for understanding and enhancing project sustainability through these key factors.

4.9. Multiple Regression Analysis

A multiple regression analysis was carried out to establish the contribution of each variable on the sustainability of donor funded food security projects. The results are shown in Table 8.

Table 8. Correlation coefficients.

	Un-standardized coefficients		Standardized coefficients		
Variable	B	Std. error	Beta	t	Sig.
(Constant)	3.77	0.451		8.36	0.004
Stakeholders' participation	0.782	0.121	0.146	6.46	0.003
Education	0.463	0.079	0.126	5.86	0.001
Training	0.473	0.073	0.045	6.48	0.005
Funding	0.532	0.073	0.142	7.29	0.004

The results in Table 8 show the correlation coefficients from a multiple regression analysis, indicating the relationships between project sustainability and the predictor variables. All predictors have statistically significant positive relationships with project sustainability ($p < 0.05$). Stakeholders' participation has the strongest influence (B = 0.782, $\beta = 0.146$, p = 0.003), followed by funding (B = 0.532, $\beta = 0.142$, p = 0.004). Training (B = 0.473, $\beta = 0.045$, p = 0.005) and education (B = 0.463, $\beta = 0.126$, p = 0.001) also contribute positively to project sustainability. The constant (3.77) represents the baseline level of project sustainability when all predictors are zero. The standardized coefficients (Beta) allow for direct comparison of predictor impacts, with stakeholders' participation and funding having the largest effects. These results suggest that enhancing stakeholder participation and ensuring adequate funding, while also focusing on training and education, can significantly improve the sustainability of donor-funded food security projects. The model provides a quantitative basis for prioritizing efforts in project management and resource allocation.

5. Discussion of Findings

This comprehensive discussion compares the findings of the current study with the reviewed literature, highlighting similarities, differences, and new insights across the key factors influencing the sustainability of donor-funded food security projects:

The study found a strong positive correlation (r = 0.773) between stakeholder participation and project sustainability, aligning with previous research. This supports Marzouki et al. (2022) and Habumuremyi and Tarus (2021) who emphasized the importance of stakeholder engagement for project success and sustainability. The high mean scores for stakeholder involvement in various project stages (composite mean 4.22) echo (Kimando et al., 2012) recommendation for engaging stakeholders throughout the project lifecycle. However, the slightly lower score for stakeholder involvement in project evaluation (mean 4.02) suggests room for improvement, which aligns with Ondiek (2016) finding that stakeholder contributions to monitoring and evaluation can be limited due to lack of technical expertise. This highlights an area for potential capacity building to enhance stakeholder participation in all project phases.

The study revealed a moderate positive correlation (r = 0.463) between education and project sustainability. This supports the literature's emphasis on education's role in fostering sustainability, as highlighted by UNESCO (2015b) and the Nelson Mandela Foundation (2017). The high mean scores for knowledge of current farming methods (4.10) and climate change impacts (4.02) align with (Achichi et al., 2023) assertion that educated communities are better equipped to adapt to technological advancements and climate change. However, the slightly lower score for awareness of new farming technology (3.96) suggests a potential gap in technological knowledge transfer, which could be addressed to further enhance project sustainability. This finding adds nuance to Mohammed (2018) discovery of a significant correlation between education and food security project execution. The study found a strong positive correlation (r = 0.618) between training and project sustainability, supporting the literature's emphasis on training's importance. The high composite mean (4.28) for training aspects aligns with and Jehanzeb and Bashir (2013) assertions about training's essential role in project implementation and sustainability. The particularly high scores for training timing (4.48) and venue suitability (4.31) suggest effective training logistics, which were not specifically addressed in the reviewed literature. This highlights an important aspect of training implementation that contributes to its effectiveness and, consequently, to project sustainability.

The study revealed a strong positive correlation (r = 0.652) between funding and project sustainability, consistent with the literature's emphasis on funding's critical role. The high composite mean (4.28) for funding aspects suggests well-managed project finances, contrasting with some literature findings. For instance, the high score for timely fund disbursement (4.09) differs from Amaya (2015) observation of frequent delays in funding disbursements. The highest score for provision of spending guidelines (4.48) aligns with Zdunek (2017) emphasis on financial guidelines as control measures. However, the overall positive perception of funding contrasts with Lango (2020) and Ochieng (2016) findings of sustainability challenges due to donor dependency, suggesting that the projects in this study may have implemented more effective financial management strategies.

6. Conclusion and Recommendations

Based on the findings and discussion presented in this study, the following conclusion and recommendations are provided:

6.1. Conclusion

This study investigated the factors influencing the sustainability of donor-funded food security projects in Bumula Sub-County, focusing on stakeholder participation, education, training, and funding. The results indicate that all four factors significantly contribute to project sustainability, with stakeholder participation showing the strongest correlation. The high levels of stakeholder involvement across all project stages suggest a collaborative approach to project management, which positively impacts sustainability. The generally positive perceptions of agricultural knowledge and education among participants indicate a good foundation for project success. The training component of the projects was well-executed, contributing to enhanced agricultural productivity. Funding aspects were also well-managed, with clear guidelines and adequate resources available.

Overall, the donor-funded food security projects in Bumula Sub-County were perceived as largely successful and sustainable, particularly in meeting quality expectations and time limits. However, there is room for improvement in areas such as budget management and stakeholder satisfaction.

6.2. Recommendations

1. Enhance stakeholder participation: Given the strong correlation between stakeholder participation and project sustainability, project managers should further strengthen stakeholder involvement, particularly in the evaluation phase where participation was slightly lower.
2. Bridge the technology awareness gap: While participants showed good knowledge of current farming methods, there is a need to improve awareness of new farming technologies. This could be addressed through targeted training programs and demonstrations.
3. Optimize training programs: Building on the success of current training initiatives, project managers should continue to focus on convenient timing and accessible venues. They should also ensure that training content remains relevant and practical for increasing agricultural productivity.
4. Maintain strong financial management: The positive perception of funding aspects should be maintained. Project managers should continue to provide clear spending guidelines and ensure timely fund disbursement.
5. Improve budget management: Given the relatively lower score for staying within budget, project managers should implement more robust budget monitoring and control measures.

By implementing these recommendations, donor-funded food security projects in Bumula Sub-County and similar contexts can further improve their sustainability, ensuring long-lasting positive impacts on food security and community development.

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