

RELATIONSHIP BETWEEN PROJECT BENEFITS AND SUSTAINABILITY OF ACTIVITIES: A COMPARATIVE ANALYSIS OF SELECTED DONOR-FUNDED AGRICULTURE-RELATED PROJECTS IN TANZANIA

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ABSTRACT

Projects should impact sustainably the people they were created to assist. Unfortunately, experience shows projects and associated benefits gradually disappear a few years after they are withdrawn. Against this backdrop, the study examined the relationship between project-related benefits and the sustainability of project activities for donor-supported projects. Using a comparative case study design, 274 respondents were sampled proportionately and interviewed using a questionnaire. Benefits were calculated using income gains from project-initiated activities. Analysis of variance results shows that the mean incomes were statistically significant based on sustainability levels, suggesting that the level of sustainability was affected by the changes in income levels. Hence, it is determined that the sustainability of project activities was statistically related to project benefits. The practical implication of the results is that local beneficiaries consider the benefit gains when deciding to engage in project-initiated activities or not. They disengage when they consider the benefits to be low, which compromises the efficacy of exit strategies implemented and the eventual sustainability of activities and outcomes. Project practitioners are encouraged to devise projects whose activities have lucrative economic benefits and expose local beneficiaries to conditions that maximise the likelihood of getting well-paid benefits from project activities.

Keywords: ANOVA, Community-based projects, Hypothesis testing, Project Benefits, Sustainability.

INTRODUCTION

Projects should impact sustainably on the people they were created to assist for as long as the condition they were designed to address exists. Unfortunately, the realisation of this development aim appears not to be realised relatively soon as projects and benefits

associated with them gradually disappear a few years after they are completed (Ika, 2012; Aarseth, 2017; Obar et al., 2017). In their review of sustainability studies, Savaya et al. (2008) estimate that around 40 per cent of community-based projects collapse within the first few years of implementation after their conclusion. Compared to other emerging nations, Africa, and more specifically the region south of the Sub Sahara has a higher prevalence of projects that do not meet sustainability standards (Gulali, 2018). Country-specific cases of project unsustainability have been reported in Malawi (Hofisi & Chizimba, 2013), Zambia (Musaana, 2019), Cameroon (Muluh, 2019), Lesotho (Nthabiseng, 2016), Ethiopia (Simane & Zaitchik, 2014), and Tanzania too (Mjema, 2017), to mention a few.

The lack of sustainability in development projects has drawn the attention of various stakeholders including policymakers, funders, project management practitioners, and scholars at the local and international levels (Carvalho & Rabechini, 2017; Aarseth, 2017). This is because project unsustainability has inherent negative consequences. For example, the needs of the supported communities remain unmet. Additionally, it results in wasteful human, monetary and technical start-up investment (Shediac-Rizkallah & Bone, 1998; Gruen, 2008). As a result, policymakers struggle to ensure the optimal use and management of resources (Rogers et al., 2008). For funders, the propensity is to achieve the project's target outcome and benefits (Zwikaël & Smyrk, 2011; Zwikaël et al., 2018). For project management scholars and practitioners, the propensity is to find out factors and processes that foster sustainability (Soderlund, 2004; Savaya et al., 2008; Badewi, 2015). The aim is to learn and improve project design, implementation, and management processes so that future projects do not similarly become unsustainable.

A review of the literature shows that most studies (see, for example, Silvius & Schipper, 2014; 2016; Martens & Carvalho, 2017; Armenia, et al., 2019) about sustainability tend to consider factors for sustainability in general terms. Only a few (eg. Mijnaerends et al., 2011; Captureanu et al., 2018; Maijo, 2020) are focused on community-based projects, the focus of this study. According to Captureanu et al. (2018), a community-based project cannot be managed using general factors because they have features that distinguish them from other traditional projects. Typically, community-based projects depend on community-based tactics, require community acceptance and participation, and entail socio-culture acceptance and management skills (Captureanu et al., 2018).

The authors divide the determinants for the sustainability of a community-based project into three categories: project-based, host organization based, and/or community-based factors. Similarly, sustainability indicators are accounted for at the organizational, community, or individual levels. According to the authors, the individual level is concerned with the benefits gained by individual local beneficiaries (LBs) from project-initiated activities after the withdrawal of donor financing. On the basis of this classification, the current study is focused on the community-based determinants of project sustainability and individual-level sustainability indicators. Nonetheless, a reflection on the critical literature review reveals that research is still needed,

particularly in the context of community-based development projects to empirically determine the relationship between project benefits and the sustainability of activities.

The dearth of information about the relationship between sustainability and the benefit gained from project activities is regrettable. This is because people commit their time and resources to project activities when the benefits of doing so are obvious and vastly outweigh the associated disbenefits and costs (Zwikaël & Smyrk, 2011; Badewi, 2015; Mkomagi et al., 2022a). Otherwise, they simply avoid engaging in those activities out of low motivation and the belief that the consequences of continued engagement would be low. It is also asserted that project practitioners are typically preoccupied with output delivery, frequently overlooking outcome and benefits management (Zwikaël & Smyrk, 2011). Additionally, substantial studies on benefits management (Breese, 2012; Chih & Zwikaël, 2015; Musawir, et al., 2017; Zwikaël et al., 2018) have concentrated on the prerequisites needed to realise project benefits and the best way to accomplish this. Others have either researched it at the implementation level (Coombs, 2015; Hietala & Päivärinta, 2021) or attempted to create benefit management frameworks (Chih & Zwikaël, 2015). Some have also attempted to assess the effectiveness of benefits management (Badewi, 2015; Serra & Kunk, 2015).

A rigorous analysis of the literature further reveals that most studies that have been done on the benefits of projects have been at the organizational or project level, based on the funders' perspectives (Zwikaël & Smyrk, 2011). Despite being in charge of carrying out project activities before, during, and after project close-out, the primary beneficiaries appear to be disregarded. This study, therefore, takes the opposite direction by focusing on primary beneficiaries at the household level. The study aimed at contributing to the body of knowledge by examining the relationship between project benefits and the sustainability of donor-supported projects using two agriculture-related community-based projects. The study projects introduced improved crop varieties and helped LBs cultivate them. Increasing the income of LBs was one of the project's objectives. In this study, a benefit refers to income earned from crops that were initiated by the study projects. The main question raised in the study is, what is the nature of the relationship between project benefits and the sustainability of project activities? Social cognitive theory provided a theoretical scaffold for the study and hypotheses, which are:

H0: There is no statistical relationship between the sustainability of project activities and project benefits.

H1: There is a statistical relationship between the sustainability of project activities and project benefits.

The remaining part of this study is organised as follows: first is a section on project benefits and sustainability, and the second is a presentation of the theoretical underpinnings followed by the methodology after which the findings are presented and discussed. The last section is the conclusions and recommendations.

LITERATURE REVIEW

Empirical Highlights on Project Benefits and Sustainability

According to Zwikael and Smyrk (2011), benefits are the flows of value that occur when planned project outcomes are realised. In this study, this definition is adopted. Thorp (2007) contends that benefits are the reason organizations invest in projects, and according to Bradley (2010), are a project's ultimate deliverable. They can be subjective and unquantifiable, like beneficiary satisfaction, or objectively quantified such as a revenue stream. Benefits are realised when the current situation changes in a way that benefits the beneficiary (Bradley 2010). Musawir et al. (2017) further argue that benefits play a crucial role in bridging the difference between desired and present benefits.

No matter the motive, every project is initiated to generate benefits (Zwikael & Smyrk, 2011; Keeys & Huemann, 2017). According to Zwikael and Smyrk (2011), project benefits should be determined by the implementers at the beginning of a project, then monitored, reviewed, and matched to the beneficiaries' needs. The authors go on to say that benefits drive project investment just like monetary gains do to business. By applying this comparison at the household level, benefits motivate local beneficiaries' investment in project-initiated activities. Recognizing the ongoing challenges implementors face in managing their interventions and delivering benefits that go beyond short-term objectives, considering the relationship between project benefit and sustainability is important. Scheirer (2005) defines sustainability as continuing project activities and sustaining project outcomes after the primary funding has ended. This definition of sustainability is also adopted in this study.

Theoretical Underpinnings

The current study is informed by the social cognitive theory (SCT, Bandura, 1997; 2001)). To explain behaviour performance the theory uses self-efficacy and outcome expectancies concepts. Self-efficacy is about how people can put forth efforts and endure challenges, or how they might become discouraged and give up. A person exhibiting self-efficacy must believe in their capability to perform the behaviour and be motivated to do so. Outcome expectancies relate to how people decide to act or not, based on the evaluation of a phenomenon's likelihood to occur and its relative value (Eccles & Wigfield, 2002). The SCT postulate that everyone has the potential to succeed, if they are given the right opportunities to pursue their objectives (Gallagher, 2012), but it also contends that there are limits to what a person can achieve individually or collectively (Maddux, 2012).

In the context of this study, it is argued that when project implementers build the capacity of LBs to undertake project activities they enhance their self-efficacy and outcome expectancies. Here self-efficacy refers to the capability to engage in project-initiated activities and address emerging challenges. Outcome expectancies refer to value judgment based on positive expectations of the behaviour, which must

outweigh the negative expectations. It is determined, therefore, that the level of self-efficacy and outcome expectancies compromise the extent of engaging in a project and the resulting benefits. The likelihood to engage in activities is similarly high where the project benefits are perceived to be high. In contrast, the possibility of engaging in project activities is low when the benefits are perceived to be low, which compromises the likelihood of LBs sustaining their engagement in project-initiated activities. Therefore, SCT provided a framework for ascertaining whether local beneficiaries' level of engagement in project activities is affected by project benefits in terms of income.

METHODOLOGY

Study Design and Area

The current study used a comparative case study design. Comparative case studies cover two or more cases in a way that produces more generalizable knowledge in an attempt to explain how and why a particular project or policy works or fails to work (Savaya et al., 2008). A comparative study entails analysing and synthesising the similarities, differences, and patterns across two or more cases that share a common focus or goal (Yin, 2003). These conditions were applicable to this study. The Integrated Soil Fertility Management (ISFM) and the ECO Adaptation to Climate Change in Central Tanzania (ECO-ACT) projects served as the study projects. The study aimed to test the nature of the relationship between the sustainability of project activities and project benefits.

The ISFM project was carried out in Tanzania's districts of Namtumbo (the Southern Highlands, between 2015 and 2018) and the ECO-ACT project in Chamwino District (the semi-arid central plateau, between 2015-2019). The Alliance for Green Revolution in Africa (AGRA) funded the ISFM project and the European Union (EU) funded the ECO-ACT project. The ISFM project supported the production of soybeans, common beans, improved maize, and improved cassava. The ECO-ACT project did, however, promote improved varieties of pearl millet, sorghum (MACIA and NACO), sunflower (RECORD), and paddy (SARO 5). Additionally, it promoted home vegetable gardening, beekeeping, and raising improved chickens and goats, which, however, are outside the realm of this paper. The fundamental focus of the study, from which this paper was developed, was the use of exit strategies, and the study projects were comparable in this regard. Figure 1 indicates the map of the study areas.

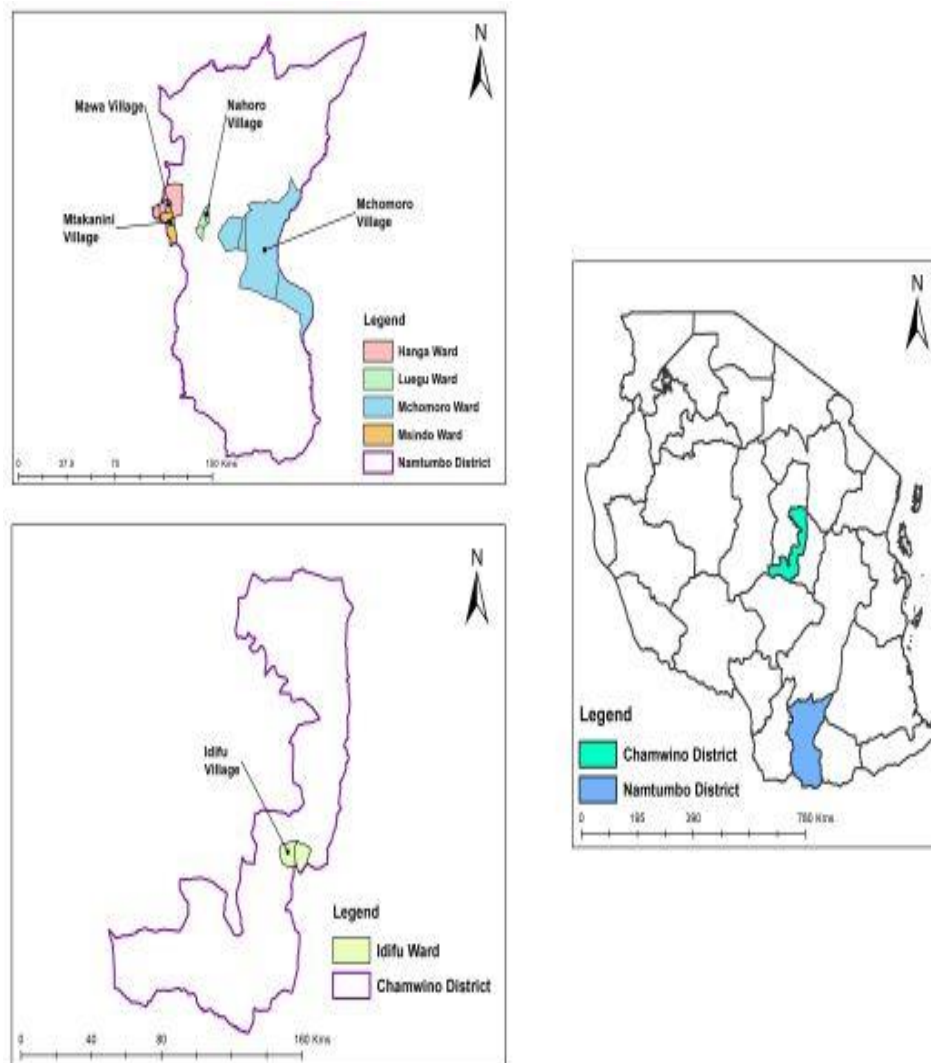


Figure 1: Map of the study area

Sampling Processes

Mtakanini, Nahoro, Mawa, and Mchomoro were the study villages under the ISFM project (out of 26 project-supported villages), while Idifu was the only village (out of two) under the ECO-ACT project. The sampling frame constituted 958 LBs (429 ECO-ACT; 529 ISFM) out of whom 274 (151 ISFM; 123 ECO-ACT) respondents were sampled and interviewed. The formula by Kothari (2004) below aided the sampling of respondents:

$$= \frac{z^2 \cdot p \cdot q \cdot N}{e^2 (N - 1) + z^2 \cdot p \cdot q} = \frac{(1.96)^2 \cdot (0.5) \cdot (0.5) \cdot (958)}{(0.05)^2 \cdot (958 - 1) + (1.96)^2 \cdot (0.5) \cdot (0.5)} = 274$$

Where: n is the sample size, N is the number of supported LBs from the sampled villages, amounting to 958, and e = 5% (0.05) level of precision, p = sample proportion, q = 1 - p, z = the value of a given confidence level. Thereafter, using a proportionate random sampling technique, 151 and 123 respondents for the ISFM and the ECO-ACT project,

respectively were obtained, as shown in Table 1.

Table 1: Summarized information of the sampling process by project

Table 1: Summarized information of the sampling process by project					
District	Ward	Village	Total beneficiaries	Estimation	Sampled Respondents
ECO-ACT Project					
Chamwino	Idifu	Idifu	429	274/958 x 429	123
subtotal			429		123
ISFM project					
Namtumbo	Hanga	Mawa	155	274/958 x 155	44
	Msindo	Mtakanini	117	274/958 x117	33
	Luegu	Nahoro	130	274/958 x130	37
	Mchomoro	Mchomoro	130	274/958 x130	37
Subtotal			529		151
Total			958		274

Source: Field survey (2021)

Methods and Instruments

A survey-based questionnaire was used to collect data from household respondents. The tool had questions on the demographic characteristics of the respondents, type of project-initiated crops produced, acreage, amount of harvest obtained, amount consumed for food or sold, and the sale price. It also included the cost of production: farm cultivation, inputs (seeds and fertilisers), weeding, harvesting, and transporting the harvested crops home. Actual data collection was done between February and April 2021.

Measurement of Variables

In this study, the dependent variable is the sustainability of project activities. It was measured on an ordinal level based on the number of project activities a respondent engaged in the cropping season preceding data collection. This was because surveys for research involving farm crop sales are typically done after the main agricultural season's harvest has taken place. Given the lack of a standard metric for measuring project sustainability at the level of activities, it was arbitrarily conceptualised as a continuum with four levels: no, low, moderate, and high in the current study. LBs who did not participate in any project-initiated activities were awarded zero. A value of 1 was awarded to those who did just one activity (out of three or four). A value of 2 was awarded to those who did one activity (out of two), or two activities (out of three or four). A value of 3 was awarded to those who continued three activities (out of four) or

maintained doing the same number of activities (either 1, 2, 3, or 4). The values of 0, 1, 2, and 3 indicated various degrees of sustainability, namely none, low, moderate, and high.

In the current study, net crop income from the project target crop enterprise was computed by adding up the total sales from project-initiated crops and the value of any unsold crops less the production costs incurred for the same (including both cash and family labour). The average sale price that a household gained for whatever project-supported crop it sold was used to value unsold harvests. Where a household did not sell its harvest, the typical sale price at the village level was considered. Family labour was similarly estimated based on typical costs at the village level. The figures computed were estimates based on the recall of what transpired.

Data Processing and Analysis

In IBM SPSS software, data processing involved data entry and cleaning. Ms Excel assisted in computing the incomes for each crop included in the study and sorting it against its corresponding level of sustainability. To produce frequencies, percentages, means, medians, and minimum and maximum values, descriptive statistics were done in IBM SPSS. Additionally, the IBM SPSS software was used to run independent T-tests and one-way between-groups ANOVA calculations to see whether there were statistically significant differences in the mean incomes based on the level of sustainability.

To examine relationships between the independent variable (project activities) and the dependent variables (project benefits), the study is based on the claim by Venkatesh et al. (2013) that researchers can examine relationships between two variables by comparing the mean of the dependent variable with the independent variable. Hence, the independent variable was categorised into low, moderate, and high levels of sustainability. Green and Salkind (2012) suggest using a T-test or ANOVA to compare the means of two groups on the dependent variable when examining the relationship between variables. The T-test is recommended when the comparison involves two groups, but when the groups are three or more, ANOVA is recommended. We used a T-test for participants in the ECO-ACT project and ANOVA for participants in the ISFM study since they met this condition, as suggested by Green and Salkind (2012). However, using an ANOVA is more advantageous than using a T-test since the Post-hoc tests allow for better type 1 error control (Hopkins, 2000, as cited in Sow, 2014)).

ANOVA analysis was conducted in five steps. To begin with, examine the sample data and note the descriptive statistics (means, standard deviation, and total count) for each of the three sustainability levels: low, moderate, and high. Second, using the p-value to

determine whether or not the assumption of homogeneity of variance was violated. Third, assessing the significance level of the ANOVA. A p-value <0.05 was indicative that there is a significant difference somewhere among the sustainability levels examined. Fourth, evaluate a multiple comparison table to locate exactly where the groups were statistically significant. Finally, graphics comparing the mean scores between sustainability levels was done.

FINDINGS AND DISCUSSION

Trend of Engagement in Project Activities

In the current study, consideration of the trend of engagement in project activities was important because project-initiated activities done by LBs were used as a proxy for measuring sustainability. In the context of this study, a project activity refers to a local beneficiary's engagement in the cultivation of project-initiated target crops.

The results (Table 2) indicate that the total number of activities done by LBs ranged from one to four. Project-wise, 27.6% of ECO-ACT beneficiaries did not grow any crops initiated by the project, which is twice the 13.0% of the ISFM project. The reason for this marked difference could be that the majority of the ECO-ACT project beneficiaries (41.5%) used to cultivate a single crop, which upon falling out of favour, left no room for any of the supported crops to grow. In contrast, the majority of the ISFM beneficiaries (52%) appear to have engaged in the cultivation of two crops. One of the reasons was found to be the project's emphasis on the crop rotation approach. Legumes (soybeans or ordinary beans) were typically planted after cereals (mainly maize) primarily to improve soil fertility, which was considered low. In aggregate, 90 (59.5%) of the LBs of the ISFM project engaged in two or more crops, as opposed to 53 (43.1%), of the beneficiaries of the ECO-ACT project, during the same period. According to the findings, crop diversification was more profound for the ISFM than it was for the ECO-ACT. Overall, more than three-quarters of LBs continued engaging in project-initiated activities. The findings support Kim et al. (2020) who reported that the engagement of LBs in development projects results in a higher investment of time, knowledge, experience, and expertise in the project.

Table 2: Trend of local beneficiaries' engagement in project-supported activities

Total Number of activities done	ISFM Project (n = 151)				ECO-ACT project (n = 123)			
	At the year of project resource withdrawal		During the cropping season preceding data collection		At the year of project resource withdrawal		During the cropping season preceding data collection	
	n=151	%	n=151	%	n=123	%	n=123	%
0	-	-	21	13	-	-	34	27.6
1	18	11.9	40	26.5	51	41.5	36	29.3
2	77	51.0	52	34.4	42	34.1	35	28.5
3	51	33.0	34	22.5	21	17.1	10	8.1
4	5	3.3	4	2.6	9	7.3	8	6.5

Source: Field survey (2021)

Status of Project Activities Sustainability

In this study, sustainability was conceptualised at the individual local beneficiary level with a focus on the sustenance of the activities done during the year of project close-out and the cropping season preceding data collection. The results (Table 3) show that the four groups that emerged from the analysis were none, low, moderate, and high sustainability. However, only three categories were featured for the ECO-ACT project. No sustainability implies that there were respondents who did not engage in any project-initiated activities in that period. Low sustainability indicates that some respondents engaged in just one activity (out of three or four done previously). Respondents who engaged in one activity (out of two done previously) or two activities (out of three or four done previously) are said to have moderate sustainability. High sustainability indicates that respondents continued to engage in the same number of activities (be it, 1, 2, 3, or 4) or engaged in three of the four possible activities.

Table 3: Levels of sustainability of project activities

Sustainability level	ISFM project		ECO-ACT Project		Overall	
	n = 151	%	n = 123	%	n = 274	%
No sustainability	21	13.9	34	27.6	55	20.1
Low sustainability	7	4.6	-	-	7	2.6
Moderate sustainability	36	23.8	21	17.1	57	20.8
High sustainability	87	57.6	68	55.3	155	56.5

Source: Field survey (2021)

Project-wise, in the results for the ECO-ACT project (Table 3), there were twice as many respondents (27.6%) than there were for the ISFM project (13.9%), indicating a higher percentage of ceremonial adopters. These are people pretending to embrace the technologies promoted by the project throughout its engagement period but, when it is

withdrawn, lose interest in its activities (Rueff & Scott,1998). Moreover, only 4.6% and 2.6% of the ISFM and ECO-ACT projects exhibited low sustainability, which is indicative that respondents in this category quit doing most of the project activities than they maintained. However, the results show that over three-quarters (77.3%) of the respondents claimed moderate or high sustainability, which suggests that respondents in these categories maintained more activities than they quit. Overall, almost 80 per cent of the study respondents continued to engage in project-supported activities at rates ranging from low (2.6%) to high (56.5%). The results' practical implication is that diversifying project activities increases the possibility of LBs sustaining project-initiated activities. The results of this study differ from Simane and Zaitchik (2014) who reported that 67 per cent of activities of community-based climate change adaptation projects in Ethiopia were unsustainable in all forms and the rest (33 per cent) were on the verge of becoming unsustainable.

Benefits from Project-initiated Activities by Source

In the current study, a benefit was conceptualised in terms of net income obtained from project-initiated activities. Improved maize, soybeans, common beans, and improved cassava were found to be the primary income sources for LBs supported by the ISFM project. Improved sorghum, pearl millet, sunflower, and paddy served similar purposes for the ECO-ACT project. Project-wise, the results (Table 4) show that improved maize, with a mean value of TZS 1 019 310.00 was the most lucrative source of income, followed by improved cassava (mean of TZS 258 775.4). Common beans were the source of income that was least lucrative. The results for the ECO-ACT demonstrate that improved sunflower, with a mean of TZS 139 680.9, was the second-most profitable source of income after improved paddy (mean of TZS 267 318.2). Even though the two projects' crops were dissimilar, across case comparison of the results reveal a significant income gap among the respondents. The low yield per acre, mainly due to the unpredictability of rainfall, and low sale prices for the ECO-ACT project are the possible reasons that could be the cause of the observed discrepancies. Low levels of production were featured in the FGD and showed that farm yields decreased after the 2019/20 cropping season due to a rise in rainfall, which was not consistent with the drought-tolerant crops promoted by the project. The findings suggest that for agricultural-based projects that are very much dependent on climatic conditions, environmental changes can make ESs less effective; making it more difficult to achieve the desired benefits.

Additional findings from the document review indicate that agriculture activities are listed as the primary source of income for smallholder households, according to

Namtumbo district strategic plan (2014 - 2018). In contrast, URT's (2007) report lists casual earnings as the primary source of income in Dodoma region, Chamwino district included, suggesting that smallholder households in the district do not treat agriculture with the same seriousness as casual activities. This could also explain why the number of respondents for the ECO-ACT who did not grow project-supported crops in the period covered by this study was twice as much as the ISFM project.

Table 4: Summary information on local beneficiaries' income (TZS) by source

Source of income	Mean	Median	Lowest	Highest	Rank
ISFM project					
1. Improved maize	1 019 310.1	656 000.0	-225 000.0	3 555 000.0	1
2. Soybeans	155 890.0	74 000.0	-86 000.0	810 000.0	3
3. Common beans	152 053.0	57 000.0	-153 000.0	1 531 000.0	4
4. Improved cassava	258 775.4	104 000.0	-378 000.0	1 900 000.0	2
ECO- ACT project					
1. Improved sorghum	110 552.5	56 990.0	-243 900.0	712 000.0	3
2. Improved pearl millet	106 294.6	24 700.0	-182 000.0	797 800.0	4
3. Improved sunflower	139 680.9	91 000.0	-235 800.0	838 600.0	2
4. Improved paddy	267 318.2	150 000.0	-11 200.0	812 000.0	1

Source: Field survey (2021)

The current study's findings indicating maize as the most profitable crop support those of FAOSTAT (2019) which show that maize is Tanzania's most significant food crop and accounts for nearly 50% of rural cash income. Soybeans, despite being an important crop for diversifying household income and nutrition (Siamabele, 2021), lost market value in the 2018/19 cropping season when the price fell from around TZS 2000 to 300 as a result of the implementation of the warehouse receipt system and the withdrawal of some key purchasers that followed (Mkomagi, et al., 2022b). This suggests that changes in trade policies can adversely affect smallholder farmers.

Benefits from Project-initiated Activities by the Level of Sustainability

In this study, the sustainability of project-initiated activities ranged from low to high. The average income, standard deviation, and lowest and maximum incomes for each category were calculated based on the levels of sustainability. According to the results (Table 5), respondents for the ISFM project were classified into three sustainability level categories: low, moderate, and high. Indicative of an upward trend, the mean incomes for these groups were found to be TZS 266 676.52, 686 276.06, and 1 356 319.42, respectively. The minimum income streams for each sustainability category, however,

were negative, indicating a loss. But, the results show a broad range across the low (TZS 1 141 000.00), moderate (TZS 3 425 000.00), and high (TZS 4 175 000.00) sustainability levels for the maximum incomes. Additionally, the results show that two-thirds of the respondents fell into the high sustainability category.

Only moderate and high sustainability levels, representing 23.6% and 76.4% of respondents, respectively, were identified for the ECO-ACT project. The mean value for moderate and high sustainability levels was TZS 174 319.52 and 247 520.58, respectively, indicating a marginal difference. Similar to the ISFM project, the minimum values for both moderate and high sustainability groups were negative. In contrast to the ECO-ACT project, LBs of the ISFM project received higher incomes, irrespective of their sustainability group. For instance, the mean income for the moderate sustainability group was around four times higher than that of the ECO-ACT project respondents. The findings imply that project activities supported by the ISFM project were more beneficial than those supported by the ECO-ACT project in terms of income generation.

Table 5: Income summary information by sustainability level

Sustainability level	Count	Mean	Standard deviation	Minimum	Maximum
ISFM project					
Low	7(5.4)	266676.52	454363.80	-273000.00	1141000.00
Moderate	36(27.6)	686276.86	867592.90	-391000.00	3425000.00
High	87(67.0)	1356319.42	1111908.66	-32000.00	4175000.00
ECO-ACT project					
Moderate	21(23.6)	174319.52	313909.19	-520000.00	919740.00
High	68(76.4)	247520.58	335115.68	-256400.00	1409300.00

Source: Field survey (2021)

Note: Figures in brackets are percentages

The observed disparities in income may have been caused by the ISFM project LBs having better market access and, consequently, more favourable prices than those supported by the ECO-ACT. They included Silver Land (for soybeans) and the NFRA (for maize). Since the ECO-ACT project lacked market linkages comparable to that of the ISFM project, LBs had less access to markets and inputs. Only Dodoma City middlemen served as the primary buyers of farm crops. Even better, maize and soybeans command a greater price than sorghum and pearl millet in normal market conditions. Additionally, in contrast to the ECO-ACT, the ISFM project LBs made extensive use of farm inputs, specifically chemical fertilizers and improved seeds. Although the ECO-ACT project

placed more emphasis on using manure, it was typically hardly done post-exit. The findings of this research, based on the ISFM project, support earlier findings by Kim et al. (2020), which showed that the outcomes of agricultural development projects improved with the beneficiaries' financial investment.

Hypothesis Testing

The main focus of this study was to examine the relationship between the sustainability of project-initiated activities and economic benefits in terms of income gains. An independent T-test and one-way between-groups ANOVA was performed for the ECO-ACT and ISFM projects, respectively.

Results from independent T-test

An independent T-test was performed for respondents under the ECO-ACT project to determine whether there is a significant difference in the income gained based on the level of sustainability. The sustainability levels compared were moderate and high sustainability levels. The homogeneity of variance assumption was validated by the Levene test results, which were above 0.05 ($p=0.377$), demonstrating the validity of this assumption. The results (Table 6) indicate that there is no statistically significant difference in the income gains between respondents in the moderate and high sustainability categories (mean = 174 319.5238; SD = 313 909.19051; $t(87)=0.888$; $p=0.377$ two-tailed). As a result, we fail to reject the null hypothesis that there is no statistical relationship between project benefits and project activities' sustainability. According to the results of descriptive statistics, the small differences in the mean incomes and standard deviations between the two groups under study could be the cause of the lack of a statistically different association. According to Cohen's (1988) criteria, even the size of the differences between groups, as determined by the generalized linear model, had a relatively low (0.009) Eta Squared value.

Table 6: Independent T-test results

Sustainability level	Count	Mean	Std. Deviation
Moderate sustainability	21	174319.5238	313909.19051
High sustainability	68	247520.5882	335115.68267

t-value = -0.888

$p=0.377$

Source: Field survey (2021)

Results from Analysis of Variance (ANOVA)

A one-way between-groups analysis of variance (ANOVA) was carried out for beneficiaries under the ISFM project to test the hypothesis that there is no difference in

income based on the levels of sustainability (N = 130). The results (Table 5.7) indicate the independent variable, levels of sustainability included three levels: low (M = 266 676.52, SD = 454 363.80, n = 7), moderate (M = 686 276.86, SD = 867 592.90, n = 36), and high (M = 1 356 319.42, SD = 1 111 908.66, n = 87).

Since it was lower than the recommended p-value of 0.05, a Levene Statistic p-value of 0.003 indicated the violation of the homogeneity of variance assumption. The outcomes of the Robust Test of Equality of Means were taken into consideration as a result. In this instance, Welch and Brown-Forsythe both got p-values of 0.000. The findings show that the ANOVA was significant, with $F(2, 127) = 7.927$ and a p-value of 0.01. As a result, there is sufficient evidence to reject the null hypothesis and draw the conclusion that incomes differ significantly based on sustainability levels. Additionally, the magnitude of the effects was determined using a generalized linear model, and the result was 0.111, which is closer to Cohen's (1988) threshold for a large effect, which is 0.114. The statistical differences observed in the ANOVA results are indicative of the fact that LBs give benefits a considerable amount of thought when making decisions on engaging in project-initiated activities. The practical side of these results is that if the LBs perceive benefit gains from the project-initiated activities as low, they disengage from project-initiated activities due to the lack of compromise between the value of desired and present benefits (Musawir et al., 2017). This, in turn, undermines the effectiveness of ESs implemented and the eventual sustainability of activities and outcomes.

A Tukey Post hoc test was additionally carried out because the overall test was significant to identify the groups in which the observed difference was present. Based on the results (Table 7), there are significant pairwise differences in respondents' mean income for respondents in low and high sustainability, moderate and high sustainability, high and low sustainability, and high and high sustainability conditions ($p < 0.05$).

Table 7: Multiple Comparisons

(I) Level of sustainability	(J) Level of sustainability	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Low sustainability	moderate sustainability	-419600.6	424167.3	.585	-1425517.1	586316.0
	high sustainability	-1089643.1*	403421.0	.021	-2046359.6	-132926.6
Moderate sustainability	low sustainability	419600.6	424167.3	.585	-586316.0	1425517.1
	high sustainability	-670042.5*	203490.8	.004	-1152623.0	-187462.2
High sustainability	low sustainability	1089643.1*	403421.0	.021	132926.6	2046359.6
	moderate	670042.5*	203490.8	.004	187462.2	1152623.0

sustainability

*. The mean difference is significant at the 0.05 level.

Source: Field survey (2021)

Additionally, the mean scores for each group were displayed on a graph (Fig. 2) for comparison. The aim was to demonstrate if respondents who scored low on sustainability received the least benefit from the project activities they participated in and vice versa. The results demonstrate that LBs reporting low sustainability had the lowest mean incomes, whereas high sustainability respondents experienced the largest income increases. This means that as income gains from project-initiated activities increased, so did the degree of project sustainability. In contrast, when it declined LBs disengaged from doing project-initiated activities, which, in return, jeopardized the effectiveness of ESs and the long-term sustainability of project activities and outcomes. Thus, the means plot proves that there is a relationship between the level of sustainability and project benefits. Descriptive statistics about the means for low ($M = 266\,676.52$), moderate ($M = 686\,276.86$), and high sustainability high ($M = 1\,356\,319.42$) levels also show disparities in the means for the sustainability groups analysed. Based on Ruvuma Region statistics of 2006/2007 (see, URT, 2014), the per capita income of Namtumbo district's residents was TZS. 426,417.00, which is lower than the income earned from project activities for moderate and high sustainability groups.

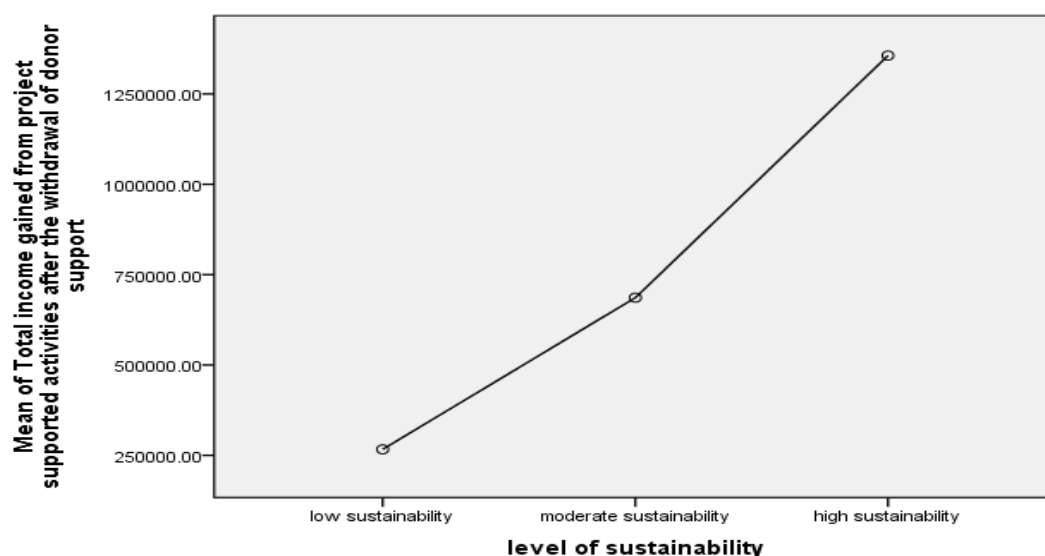


Figure 2: Comparison of means scores between sustainability levels and income gained

Source: Field survey (2021)

CONCLUSION AND RECOMMENDATIONS

Conclusion

Based on two donor-funded agriculture-related projects in Tanzania, the study tested the hypothesis that the sustainability of project activities is not statistically related to project benefits. Project benefits were calculated using income earned from project-initiated activities. Based on the project-initiated activities, sustainability levels were categorised into low, moderate, and high. Independent T-test results indicated a lack of statistically significant differences in the mean incomes based on the levels of sustainability, suggesting that the observed differences in mean incomes were too small to cause changes in the level of sustainability. Nonetheless, ANOVA results showed that the mean incomes were statistically significant based on the levels of sustainability, which implied that project benefits affected the level of sustainability. Moreover, LBs engaging in three or four project-initiated activities commanded more benefits than those with one or two activities. It is, therefore, concluded that the sustainability of project activities was statistically related to project benefits, based on ANOVA results. It is, additionally, determined that diversifying project activities increased the likelihood of LBs sustaining project-initiated activities at a moderate or high level. In contrast, LBs with one or two activities earned low income and exhibited a lower likelihood to sustain project activities, which, in turn, jeopardized the effectiveness of ESs and the long-term sustainability of project activities and outcomes.

Recommendations

The study has shown that for LBs to continue participating in project-initiated activities, they must recognize and value the financial gains associated with those activities. It is recommended that project exit plans expose LBs to conditions and opportunities that increase the likelihood of LBs getting lucrative benefits from doing project activities. Effective capacity building is one example, as is linking LBs to large commercial buyers, secondary input suppliers, and extension services, to name a few.

It has been concluded that economic benefits determine the level of sustainability. It is, therefore, advised that practitioners establish projects whose activities have lucrative economic values. Practitioners can accomplish this by making sure LBs participate in designing project activities during the planning stage.

It has been indicated that LBs who engaged in fewer project activities are more likely to disengage from doing the same than those engaging in multiple activities. It is recommended that an evaluation of LBs adoption.

flexibility be conducted sometime before the final project withdrawal to identify any areas that require additional capacity-building or behaviour-changing techniques and take corrective measures accordingly.

Overall, the results of this study cannot be generalized. However, highlighting the necessity of taking project benefits into account in project management studies and interventions provides a useful message to project practitioners and scholars alike.

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Declaration of Interest Statement

The authors declare no conflict of interest exists.

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