



## A COMPARATIVE ANALYSIS OF LIVELIHOOD OUTCOMES AMONG PARTICIPANTS AND NON-PARTICIPANTS IN THE MOUNT MERU COFFEE PROJECT, ARUMERU DISTRICT

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### ABSTRACT

While coffee agricultural projects are widely acknowledged as key drivers of economic growth, many smallholder coffee farmers in Arumeru District continue to resist participation in such initiatives. This study was conducted to assess and compare the livelihood outcomes of participants and non-participants in the Mount Meru Coffee Project. The research employed a cross-sectional design and an exploratory sequential mixed-methods approach, where qualitative data were collected first, followed by quantitative data. A sample of 155 smallholder coffee farmers was selected through simple random sampling. The qualitative data were analysed using thematic content analysis with a constant comparison approach, while the quantitative data were analysed using Statistical Package for Social Sciences, with descriptive statistics computed to obtain frequencies and percentage distributions. Multiple responses analysis was used to assess the perceived benefits of farmers' participation in the project, and a t-test was applied to compare livelihood outcomes between participants and non-participants. The study found that the perceived benefits of participating in the Mount Meru Coffee Project include increased coffee income, improved yields, risk sharing, the adoption of improved coffee farming practices, access to marketing information, and enhanced coffee farming knowledge and skills. A comparison of livelihood outcomes revealed significant differences between participants and non-participants, with participants exhibiting higher livelihood outcomes at a p-value of  $<0.005$ . The study concludes that participation in the Mount Meru Coffee Project significantly improved the livelihood outcomes of smallholder farmers, particularly in areas such as human capital, social capital, assets, and household income. To ensure equitable access to opportunities, the study further recommends that local government authorities actively promote the Mount Meru Coffee Project model, particularly in terms of improving farmers' access to market information and develop solutions to constraints within their capacity.

**Keywords:** Livelihood outcomes, Participation, Smallholder coffee farmers, Mount Meru Coffee Project

**Paper type:** Research paper

**Type of Review:** Peer review

### 1. Introduction

Agricultural projects that support the production and marketing of coffee play a crucial role in enhancing household livelihood outcomes, particularly in terms of human capital, social capital, assets, and household income. Globally, coffee is one of the most significant cash crops for nations and farmers alike



(Kimaro et al., 2020). It is estimated that coffee is produced in over 70 countries, with Brazil, Vietnam, Colombia, Indonesia, and Ethiopia being the largest producers (ICO, 2015). According to Mhando et al. (2013), the cultivation of coffee in many parts of Africa, including Tanzania, was initially introduced by missionaries and later adopted by small-scale farmers in the 1920s. During this period, coffee cultivation was linked to the cooperative movement, involving native farmers in the 1920s and 1930s. Today, coffee production remains largely in the hands of smallholder farmers, particularly in developing countries such as Tanzania (Louhaichi et al., 2018). Despite its importance, coffee production in Tanzania has experienced significant fluctuations due to a combination of internal and external challenges. Ragasa, Lambrecht & Kufoalor (2018) highlights that the decline in production is partly attributed to a sharp reduction in prices, which has fallen by over 30%, impacting the livelihoods of small-scale coffee farmers (Mhando et al., 2013). These challenges underscore the close link between livelihoods and coffee production, as coffee serves as a key income source for many farmers (Mishra et al., 2018).

The economic liberalisation policy in the 1980s, which led to the removal of subsidies in the agricultural sector, further exacerbated the plight of smallholder coffee farmers. This policy shift made it difficult for farmers to access adequate and quality inputs required for optimal coffee production (Mhando et al., 2013). In Arumeru District, coffee production dates back to the late 19th century, during the German colonial rule in East Africa (URT, 2012). Since then, however, production has faced a steady decline due to factors such as diseases, climate change, falling coffee prices, unfavourable agricultural policies, youth disinterest in agriculture, lack of improved varieties, and the increasing cost of production (Kimaro et al., 2017). In response to these challenges, the Tanzanian government has implemented several initiatives aimed at improving coffee production and enhancing the livelihoods of smallholder farmers. These efforts include the Agricultural Sector Development Programme (2003), the establishment of the National Coffee Research Institute (2000), and the formulation of the Tanzania Agricultural Policy (1997) and Cooperative Policy (2002). These initiatives were designed to promote agricultural productivity, including coffee, and enhance the livelihoods of small-scale farmers (DFID, 2018). Despite these efforts, smallholder coffee farmers continue to face challenges, such as climate change, the lack of subsidies, and limited access to essential coffee production inputs (Mapunda et al., 2020). These challenges have adversely affected the livelihood capabilities of smallholder farmers, particularly in terms of on-farm, non-farm, and off-farm activities (TCB, 2017).

To address these issues, the Milwaukee Synod of ELCA and the Evangelical Lutheran Church in Tanzania (ELCT) Diocese of Meru entered into a partnership in 1999 to support coffee-growing families through the Mount Meru Coffee Project (Makoninde, 2010). The project began selling coffee abroad within the congregations of the Greater Milwaukee Synod (GMS) in 2002 (Annual Report, Mount Meru Coffee Project, 2022). Previous studies have demonstrated the significant impact of coffee production on smallholder livelihoods. For instance, Mmari (2012) reports that the coffee industry directly and indirectly employs approximately 2.5 million people in Tanzania. While there is substantial literature on the contribution of coffee production to livelihood improvement, there has been limited research on the role of private-sector-driven coffee production projects (Bates, 2003; Kimaro et al., 2017; Mmari, 2012; Maghimbi, 2012; Mhando et al., 2013; Mapunda et al., 2020). Consequently, the differences in livelihood outcomes between smallholder coffee farmers who participate in such projects and those who do not remain underexplored, particularly in the context of Arumeru District.

Furthermore, the livelihood outcomes of households involved in coffee projects are challenging to generalise, as they are influenced by location-specific cultures, traditions, and the models used for project implementation (Akyoo, 2021). Thus, empirical evidence from diverse contexts is crucial for a deeper understanding of these outcomes. This information is valuable for policymakers, researchers, and development partners, particularly those involved in promoting partnership projects and empowering coffee farmers. Therefore, this study aimed at providing empirical evidence on the livelihood outcomes of participants and non-participants in the Mount Meru Coffee Project. Hence, the study was grounded in the Sustainable Livelihoods Framework, as developed by DFID, which focuses on utilising resources as assets to improve human well-being and foster development. This framework considers livelihood assets,

processes, structures, and strategies to achieve positive livelihood outcomes (Wendimu et al., 2016). The primary objective of this study is to compare the livelihood outcomes of participants and non-participants in the Mount Meru Coffee Project.

## 2. Research Methods

The study was conducted in Arumeru District, where four villages Nkoaranga, Ngyani, Songoro, and Mulala were purposively selected. Arumeru District was chosen for its high concentration of approximately 5,000 smallholder coffee farmers participating in the Mount Meru Coffee Project (Mount Meru Coffee Project Annual Report, 2023). The villages were selected from two wards: Nkoaranga and Songoro. Within each ward, two villages were chosen: Nkoaranga and Ngyani from Nkoaranga Ward, and Songoro and Mulala from Songoro Ward. A cross-sectional research design was adopted to assess livelihood outcomes in terms of human capital, social capital, assets, and household income of participants and non-participants in the Mount Meru Coffee Project. This design allows for data collection at a single point in time, enabling the measurement of outcomes and exposures among the study respondents simultaneously (Bernard, 2017). The cross-sectional design was deemed appropriate because it is cost-effective, less time-consuming, and facilitates the collection of a broad range of information (Babbie, 1990; Omolo, 2017). The sampling unit for this study was the household engaged in coffee production. An exploratory sequential research strategy was employed, beginning with the qualitative phase of data collection and analysis, followed by a quantitative data collection phase.

The exploratory approach was chosen to integrate the findings from both stages, thereby expanding the scope and enhancing the quality of the results (Courtney, 2017). Qualitative data collection involved Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs). Six FGDs, each with six to eight participants, were conducted across the four villages (Nkoaranga, Ngyani, Songoro, and Mulala) with individuals knowledgeable about coffee production. Additionally, ten KIIs were purposively selected based on their roles, knowledge, and involvement in the Mount Meru Coffee Project. These included two Mount Meru Coffee Project extension workers, two Ward Executive Officers (WEOs), four Village Executive Officers (VEOs), and the Meru District Agricultural, Irrigation, and Cooperative Officer (DAICO). Quantitative data collection involved a household survey with 155 households. The sample size was estimated using a simplified formula provided by Israel (2013):

$$n = \frac{N}{1 + N(e^2)}$$

Where:

n is the sample size,

N is the total population of coffee farmers,

e is the error margin.

Thus, using a population size of 700 coffee farmers:

$$n = \frac{700}{1 + 700(0.05^2)} = 154.54 \approx 155 \text{ respondents.}$$

The sample size of 155 households is justified by the principle that "too large a sample implies a waste of resources, and too small a sample diminishes the utility of the results" (Kingu, 2023). To determine the sample size for each village, a proportionate sampling method was applied. This approach, as suggested by Kothari (2004), ensures that the sample is representative of the population in each village. The coffee farmers participating in coffee production were as follows: 173 households in Mulala village, 75 in Songoro, 167 in Nkoaranga, and 160 in Ngyani. Using the proportionate sampling method, the sub-sample for each village was calculated using the formula:

$$\text{Proportion} = \frac{\text{Cluster Sample (Location)} \times \text{Desired Sample Size}}{\text{Total Population}}$$

For this study, the formula was applied to calculate the sample from each village, ensuring a representative and proportionate selection of households across all four villages.

**Table 1 Proportional Sample Calculation**

Village	Propotional Sample Calculation	Respondents
Mulala	$173 \times 155/700$	38
Songoro	$75 \times 155/700$	16
Nkoaranga	$67 \times 155/700$	36
Ngyani	$160 \times 155/700$	35
Total		155

The quantitative phase of data collection involved a household survey with 155 smallholder coffee farmers. Proportionate stratified sampling techniques, based on a household village register, were employed to determine a sub-sample from each village. Qualitative data were analysed using content analysis, where the transcribed words were organised into different themes aligned with the study objectives. Quantitative data were entered into the Statistical Package for Social Sciences (SPSS), version 25. Descriptive statistics were employed to determine the perceived benefits of coffee farmers participating in the Mount Meru Coffee Project. A t-test was used to compare livelihood outcomes between participants and non-participants in the Mount Meru Coffee Project.

The dependent variable, livelihood outcomes, was measured using a Livelihood Outcomes Index. This index was designed to assess how engagement in the Mount Meru Coffee Project improved human capital, social capital, household assets, and household income. Each of these livelihood outcome indicators was measured through three sub-indicators, resulting in a total of 12 sub-indicators. These sub-indicators were assessed on a three-point Likert scale (low, medium, and high livelihood outcomes), with the responses coded as 1, 2, and 3, respectively. The overall scores for each of the four indicators were calculated, and these scores were used to develop the Livelihood Outcome Index. The highest possible score for the four indicators was calculated by multiplying 3 by 12, yielding a maximum score of 36. The mid-value was determined by multiplying 2 by 12, resulting in a score of 24, and the minimum possible score was obtained by multiplying 1 by 12, yielding a score of 12. Thus, the mid-cut value of 24 was coded as 'medium,' scores between 12 and 23 were categorised as 'low,' and scores between 25 and 36 were categorised as 'high.'

### 3. Findings and Discussions

#### 3.1 Perceived benefits of coffee farmers' participation in the Mount Meru Coffee Project

Smallholder coffee farmers participating in the Mount Meru Coffee Project were asked about their perceived benefits, with multiple responses permitted. The results presented in Table 1 show that 59% of the interviewed farmers reported an increase in income from coffee farming as a direct result of their participation in the Mount Meru Coffee Project. This indicates that participation in the project has led to a significant boost in coffee farmers' incomes. Furthermore, 52.23% of the interviewed farmers indicated that their coffee yield had increased due to their active involvement in the Mount Meru Coffee Project. These findings align with those of Bellemare (2018) and Ragas et al. (2018), who reported that smallholder farmers experience higher yields as a result of improved farming practices, such as the use of fertilisers and pesticides.

Additionally, the participation in the project appears to have contributed to improved farming practices and increased access to resources, which are key factors in enhancing productivity. The data suggests that these improvements in both income and yield are directly linked to the various support mechanisms provided by the Mount Meru Coffee Project, such as technical training, access to quality inputs, and better market access for the coffee produced. These findings are consistent with the literature including Kimaro et al. (2020) and Mhando et al. (2013) emphasises that agricultural projects such as the Mount Meru Coffee Project can significantly improve the livelihoods of smallholder farmers by enhancing both the income and productivity of their agricultural activities. Such projects contribute to the overall economic resilience of the households, thereby improving their ability to meet basic needs and invest in further development initiatives.

**Table 2 Perceived Benefits of Coffee Farmers Participation in Mount Meru Coffee Project (n=155)**

Benefits	Count	Percent (%)
Increased Coffee Income	91	59
Improved yields	81	52.23
Risk Sharing	48	30.97
Adoption of Improved coffee farming practices	93	60
Marketing information sharing	107	69
Improved coffee farming knowledge and skills	106	68.97

\*Multiple responses

The results further indicate that 60% of smallholder coffee farmers participating in the Mount Meru Coffee Project reported that the project had helped them adopt new technologies in coffee farming activities. This finding suggests that the project has facilitated the integration of innovative farming practices, which can enhance productivity and sustainability. Furthermore, 69% of smallholder coffee farmers mentioned that their participation in the Mount Meru Coffee Project enabled them to access crucial marketing information, such as agreed-upon coffee prices, required quality standards, and delivery schedules, as well as information about collection centres. This highlights the project's role in improving market access and ensuring that farmers are well-informed about market conditions and requirements. These findings support those of Ba et al. (2019), who reported that the participation of smallholder farmers in associations or projects is significantly influenced by their access to vital marketing information, including prices of inputs and outputs, marketing opportunities, and appropriate technologies. Thus, the Mount Meru Coffee Project not only facilitates technological advancement but also empowers farmers with the necessary knowledge to navigate the market effectively.

Likewise, the results presented in Table 1 indicate that 68.97% of smallholder coffee farmers reported an improvement in their coffee farming knowledge and skills as a result of their involvement in the Mount Meru Coffee Project. This demonstrates the effectiveness of the project's extension services in enhancing farmers' competencies in coffee cultivation. The extension services offered by the project appear to have equipped farmers with better skills in coffee farming practices. This was also supported by Focus Group Discussion (FGD) participants across the villages, who shared that:

“...The Mount Meru Coffee Project has been immensely helpful to us in terms of acquiring skills and knowledge on coffee pruning, fertiliser and pesticide application, and suitable crops to interplant with coffee...” (FGDs in three villages).

Moreover, 30.97% of coffee farmers reported that they shared risks among themselves when the price of coffee in the global market dropped. This suggests that the project provides a risk-sharing mechanism among farmers, which is essential for protecting their livelihoods in the face of price volatility. In the event of such risks, farmers are compensated by the Great Milwaukee Synod as part of their contractual obligations. These findings align with the work of Mishra et al. (2018), who argued that risk-sharing among partners can help increase productivity and mitigate the negative impacts of income reduction and financial loss. However, these results contrast with those reported by Louhaichi et al. (2018), who found that, in some cases, smallholder farmers were reluctant to join farmers' groups when they perceived that such groups introduced new risks. This discrepancy suggests that while risk-sharing mechanisms may be beneficial, the perception of additional risks can deter some farmers from participating in such initiatives.

### 3.2 Livelihood outcomes among Mount Meru Coffee Project participants and non-participants

The results from an independent samples t-test revealed a significant difference in livelihood outcomes between Mount Meru Coffee participants and non-participants ( $p < 0.05$ ), as shown in Table 2. This indicates that participation in the Mount Meru Coffee Project has had a measurable impact on the livelihood outcomes of the farmers involved. The comparison suggests that participants in the project have experienced improvements in key livelihood indicators, such as human capital, social capital,

household assets, and income, compared to non-participants. This finding highlights the potential benefits of project involvement for smallholder farmers, particularly in terms of enhancing their overall wellbeing and economic stability.

**Table 2: Livelihood outcomes Index among Mount Meru Coffee Participants and Non-Participants**

Variable	Participation	N	Mean livelihood outcome	F-value	Sig.
Livelihood outcomes	Participants	100	14.013.	0.467*	0.005
	Non-Participants	55	13.923		

\*Means significant at the 5% level

This can be explained by the fact that the Mount Meru Coffee Project provides more benefits to its participants than to non-participants. In many cases, agricultural projects, such as Mount Meru Coffee, offer training on best agronomic practices and provide inputs that increase the likelihood of improved coffee productivity, which, in turn, leads to higher incomes for participants. Additionally, the project directly sells coffee to final consumers in America, which enables farmers to command higher prices for their coffee products. The key informant interviews further support this observation. One participant noted:

“...I am glad to see that the Mount Meru Coffee farming project is making efforts to improve our lives. One example is the improvement in home ownership and the upgrading of houses with iron sheet roofs or other materials. Farmers have also observed changes in asset ownership after the implementation of the project...” (Chairperson of Mount Meru Coffee, 23-05-2023).

These results are further corroborated by the findings from the FGDs, as expressed in the following quote:

“...The Mount Meru Coffee project has been helpful to us through credit schemes; agricultural inputs like seeds and fertilisers are provided to groups by Mount Meru Coffee, in collaboration with donors from the Great Milwaukee Synod in the USA...” (FGDs in Songoro Village).

This suggests that households participating in the Mount Meru Coffee project are better positioned to enhance their agricultural production and other economic activities, which ultimately leads to improved livelihood outcomes. A study by Bahaman et al. (2009) in Malaysia highlighted that social capital is a vital asset for improving household livelihood outcomes, particularly as credit schemes are often delivered through group structures. These findings align with the results reported by Christopher (2010) in Uganda, where coffee producers in the Bukonzo Joint project were able to educate their children, acquire new assets such as land, and improve their housing conditions.

#### 4. Implications of the Study's Findings

The findings of this study are highly significant for both policy development and implementation, as they shed light on the roles played by the Mount Meru Coffee Project in enhancing the livelihoods of smallholder coffee farmers. The primary contribution of this study lies in its potential to inform the development of tailored policies that can guide development actors in improving coffee farming practices, ultimately leading to better livelihood outcomes for farming households. A key component for the success of any policy intervention is the empowerment of local communities. The findings underscore the urgent need to strengthen institutional support to mitigate the threats posed by a lack of skills in both effective coffee farming techniques and market access. Strengthening partnerships between the private and public sectors, encouraging NGO involvement, and improving extension services are crucial for the effective capacity-building of coffee farmers.

The partnership between the Tanzania Coffee Research Institute and the Mount Meru Coffee Project, which has provided hands-on training to coffee farmers for several years, has led to improvements in both the quality and quantity of coffee produced. This, in turn, has resulted in increased incomes from coffee farming. Furthermore, the study highlights the importance of strategically allocating resources to support farming communities. Initiatives should include key components such as sustainable agricultural practices and assured market access. In terms of global development goals, this study contributes to the achievement of the Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty) and SDG 2 (Zero Hunger), by demonstrating the potential for sustainable farming initiatives to improve the economic well-being of smallholder farmers and promote food security.

## 5. Conclusion and Recommendations

The Mount Meru Coffee Project in Arumeru District has demonstrated its potential to significantly improve the livelihood outcomes of participating smallholder coffee farmers. The comparison between participants and non-participants reveals a noticeable difference in livelihood outcomes, with participants deriving greater benefits from their engagement in the project compared to non-participants. It is essential for development practitioners in the coffee production sector to understand the specific benefits that participants gain from projects like the Mount Meru Coffee Project. This understanding can help in designing targeted strategies to maximise these benefits and expand their reach. The positive outcomes experienced by households involved in the Mount Meru Coffee Project can be shared with non-participants through awareness campaigns. By highlighting the advantages of participation, such campaigns can encourage wider involvement among smallholder coffee farmers. Local government authorities in Arumeru District should facilitate regular meetings among smallholder coffee farmers to discuss challenges and explore practical solutions within their capacity. These meetings can provide a platform for farmers to share experiences, discuss common issues, and collaborate on overcoming constraints in coffee production. In partnership with local government authorities, the Mount Meru Coffee Project should actively promote its model as a proven approach for improving livelihoods in the coffee sector. The success of this model suggests that it offers a more sustainable and effective livelihood option compared to other models commonly adopted by smallholder coffee farmers. To enhance equity between participants and non-participants in terms of livelihood outcomes, both local government authorities and non-governmental organisations should take proactive steps to encourage greater participation in the Mount Meru Coffee Project. This can be achieved by raising awareness, providing necessary resources, and fostering an enabling environment for more farmers to join the project, ultimately increasing its overall impact.

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