EVALUATING THE IMPACT OF COOPERATIVE TRAINING ON LIVELIHOOD CAPITALS OF COCOA FARMERS IN ONDO STATE, NIGERIA

Sofoluwe N.A[1,*], Adeleke, A.M[1,2], Ologbon, O.A.C[1,3] and Dada, O.M[1,4]
[1,*]Department of Cooperatives and Rural Development, Olabisi Onabanjo University, Ago-Iwoye, Ogun State, Nigeria, email address: sofoluwe.nurudeen@oouagoiwoye.edu.ng; ORCID: https://orcid.org/0000-0003-2566-4340
[2.]Email address: alimatadeleke9@gmail.com
[3.] Email address: ologbon.christopher@oouagoiwoye.edu.ng; ORCID: https://orcid.org/0000-0002-6309-4214
[4.]Email address: dada.omolara@oouagoiwoye.edu.ng; ORCID: https://orcid.org/0000-0002-9073-5005

Abstract
Cocoa is an important export crop and a source of livelihoods for farmers in Nigeria. The traditional method of producing and processing this crop has had a negative impact on the livelihoods of many cocoa farmers. Cooperative support through training has been embraced by the farmers to enhance their capacity for asset accumulation. The attendant impact of this training, however, remains unknown. This study identified types of training provided by cooperatives to the cocoa farmers, the factors influencing access to this training, and its impact on the accumulation of livelihood capital by the farmers. We surveyed a total of 250 cocoa-producing farmers through a multistage sampling method. The primary data collected were analysed using descriptive statistics, the Probit model, and a non-parametric propensity score matching technique. The results show that the types of training provided by the farmers' cooperatives include postharvest management (77.7%), loan management (74.3%), tools management (56.4%), and harvesting skills (52.5%), respectively. The results show a positive and significant (5%) effect of education ($\beta = 0.595$, $z = 2.09$, $p< 0.05$) and cooperative membership ($\beta = 3.911$, $z = 3.84$, $p< 0.01$), and age ($\beta = 0.595$, $z = 1.73$, $p< 0.10$) on access to training. The findings show that access to cooperative training has a positive and significant (5%) impact, leading to an increase of ₦6605.454 ($4.16) in total values of physical asset accumulation. The estimated impact (ATT) of cooperative training on the financial assets of farmers is negative with a reducing value of -₦1,551,486.75 ($976.56). These findings show that cooperative training has a mixed effect on the livelihood assets of cocoa farmers; the effect is positive on physical assets accumulation but negative on financial assets acquisition. This implies that cooperative organisations have a more role to play in boosting farmers livelihood improvement.

Keywords: Cooperatives, training, cocoa, livelihoods, assets.

AJCDT, Vol. 9 No. 1 (December, 2025), pp. 141 – 148, © 2025 Authors

INTRODUCTION

In Nigeria, cocoa is one of the major agricultural export crops, providing livelihoods for several farming households. The crop contributes to the country's GDP, foreign exchange earnings and job opportunities. However, after years as a top producer of the crop, Nigeria currently ranks

sixth among the cocoa-producing countries globally following Cote d'Ivoire, Indonesia, Ghana, Cameroon and Ecuador, respectively (Kehinde et al., 2022; Oduro-Owusu, 2024). The national output now drops significantly to an average of 200,000 tonnes with attendant loss of income and other livelihood capitals for the farmers (CBN, 2023). Some of the identified causes of these challenges include lack of access to modern training on cocoa farming, constrained access to market and credit with collateral challenges. Cooperative organisations are believed to have the capacity to support farmers towards reducing their challenges. To improve the livelihoods of the farmers and enhance their access to productive assets and farm capitals, many farmers have returned to cooperative organisations to benefit from social and economic benefits that could position them for better livelihood acquisition. Cooperatives provide opportunity for farm cost reduction, training to improve knowledge, provision of platform for joint marketing, and skills as well as management of the overall farm challenges (Sofoluwe & Yinusa, 2021; Bannor et al., 2022). These are with a view to improving access to livelihood capitals acquisition for farmers as well as farming households' welfare. Despite the increasing number of cocoa farmers joining cooperative organisations, the attendant effect of such participation and the anticipated benefits from cooperative training have received limited attentions. Previous studies have shown that participation in cooperatives is often influenced by various factors, such as socio-economic characteristics, farm size, and geographical location (Sofoluwe & Yinusa 2021; Sofoluwe, 2019; Gashaw & Kibret, 2018), but there is a lack of detailed understanding of the specific effects of cooperative training in particular on cocoa farmers' livelihood outcomes. Specifically, there is a limited quantitative evaluation of cooperative training impacts in Nigeria's cocoa sector. The objectives of the study are to: (i) identify the type of cooperative training provided to cocoa farmers; (ii) analyse the factors influencing access to such training; and, (iii) examine the attendant effect of such cooperative training on physical and financial assets of cocoa farmers in Nigeria. To support farmers' quest for livelihood assets' acquisition, access to training is important (Oduro-Owusu et al., 2024). Enhanced farmers' livelihood capital is central to repositioning the cocoa farming sub-sector in Nigeria. The study provides empirical insights into the training services rendered by cooperatives to support farmers especially those in cocoa farming and the effect of such cooperative efforts on the farmers' livelihood capitals. The study adds to the empirical literature on the roles of agricultural cooperatives in providing livelihood support to farmers. It highlights the specific training components disseminated to cocoa farmers and provides an insight into the empirical approach to estimating the effect cooperative actions.

Theoretical Review: Drawing from Human Capital Theory, cooperative training enhances the knowledge, skills, and competencies of cooperative members. Training in areas such as financial literacy, entrepreneurship, technical production skills, and cooperative governance increases members' ability to make informed decisions, improve productivity, and manage their enterprises more effectively. Consequently, cooperative training directly contributes to the accumulation and enhancement of human capital (Nderitu *et al*., 2019). Cooperative training also contributes to the improvement of financial capital by enhancing members'

capacity to effectively manage financial resources (Bhukuth *et al.,* 2018). Training on cocoa production techniques, savings mobilization, market analysis, value chain upgrading, and enterprise development equips members with tools to increase income, reduce financial risks, and access credit. By improving financial management practices, cooperative training supports stable and diversified livelihood strategies (Mohammadi, et al., 2023). Physical capital refers to the infrastructure, equipment, and productive assets that support livelihood activities (Uddin et al., 2022; Zhang &Yang, 2025). Cooperative training improves the ability of members and leaders to acquire, maintain, and utilize such assets. Training in resource planning, operations management, and asset maintenance strengthens the cooperative's physical resource base, enabling more efficient service delivery and enhanced livelihood structure (Natarajan et al., 2022).

METHODS

The study was carried out in Ondo State, Nigeria. The study area is the leading cocoa producing state in Nigeria. A multi-stage sampling procedure was used. In the first stage, three local governments with the highest cocoa production level were purposively selected. At the second stage, communities with the highest cocoa production level were selected from each local government area. At the third stage, the farmers were stratified in two: cooperative and non- cooperative cocoa farmers. There was a total of 390 cocoa farmers who are members of cooperatives and 280 members who did not join any cooperative organisations. This gives a total of 670 population size for the study. A total of 250 farmers were randomly sampled based on the sampling frame of the farmers in the area. The non-cooperative members were included as control for proper evaluation of the effects of cooperative membership and assets accumulation. The inclusion enables proper isolation of the effects of access to training on assets ownership of the farmers. Taro-Yamane formular was used with 5% margin of error to obtain the sample size of 250 through a validated structured questionnaire. The data covered the types of training provided by the farmers, the factors that could influence access to training based on the extant literature, and measures of two of the five major livelihood capitals. These capitals are physical assets (farming equipment) and financial capital (income) of the farmers. The data were analysed using descriptive statistics, the probit model and the propensity score matching method to estimate the impact of the training on livelihood assets of the farmers.

The probit model is explicitly specified as:

$$Y_i = \beta_\circ + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + + \beta_7 X_7 + \varepsilon_i \quad (1)$$

Where:

Y = access to cooperative training measured as a dummy (access =1; no access = 0), X_1 = sex of the respondents (Male =1; Female =0), X_2 = age of the respondents in years, X_3 = household size in numbers, X_4 = farm experience in years, X_5 = farm size in hectare, X_6 = membership in cooperative (1 = member, 0 =otherwise), and X_7 = access to cooperative credit (access = 1, 0, otherwise). Financial asset was measured by total income (₦ = Nigerian Currency) generated by farmers in the last production season; Physical assets were measured by the total market values (₦ = Nigerian Currency) of the physical assets (Weighing scale, Harvesters, Sprayers and storage facility) acquired by the farmers β represents the parameter to be estimated and i is the error term. In the probit

model, the coefficient (β) cannot be used directly to interprete the changes in probability because the relationship between the 'Xs' and the P(Y=1) is nonlinear. Hence marginal effect is used as the changes in the probability of Y given X.

The Propensity Score Matching Method: The Propensity Score Matching (PSM) model is used to control for self-selection bias that arises when access to cooperative training and its effect on livelihood capital is not random. Cocoa farmers' access to training provided by cooperative may influence their acquisition of livelihood assets (e.g., physical and financial), but access itself is subject to selection bias. Therefore, estimating the causal effect of access to cooperative training on livelihood capital requires adjusting for differences in observable characteristics between those who accessed the training and those who did not. Hence, the need for a model like PSM. The key parameter of interest in such non-experimental settings is the Average Treatment Effect on the Treated (ATT), represented as:

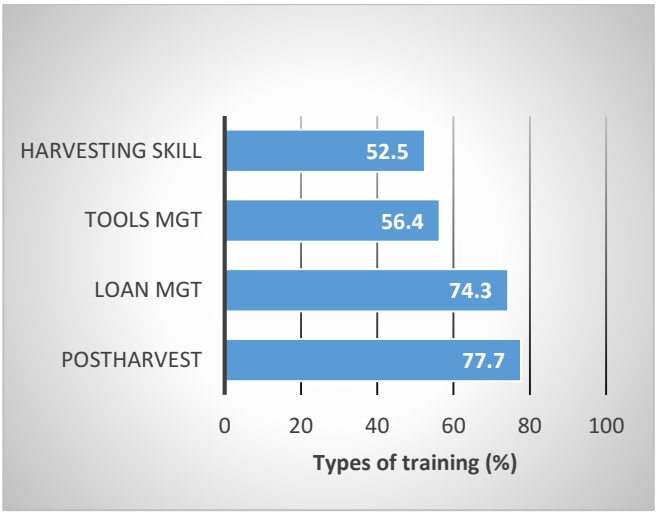
$$= E(Y_1 - Y_o|\ D = 1)$$
$$= E(Y_1|\ D = 1) - E(Y_o|\ D = 1) \qquad (2)$$

where Y_1 is the livelihood assets' outcome (e.g., physical and financial) if the cocoa farmer had access to training (1), and Y_o is the livelihood capital outcome without access to training and D denotes participation in the treatment group (i.e., those who had access to training).

RESULTS

Types of Cooperative Training Provided to the Farmers: The results show that the types of training provided by the farmers' cooperatives include postharvest management (77.7%), loan management (74.3%), tools management (56.4%), and harvesting skills (52.5%), respectively (Figure 1).

Figure 1: *Type of Cooperative Training Available to the Cocoa Farmers*



Note: **Source: (Field Survey, 2025).**

The factors influencing access to cooperative training by cocoa farmers: Table 1 shows the Probit estimate and its marginal effect on the factors determining access to cooperative training by the sampled cocoa farmers. The model's diagnostic parameters shows that the model specification is fitted to the data. The estimated likelihood ratio of the specification (LR $Chi^2 = 119$, $P < 0.05$) is significant at 5%. Similarly, the Pseudo R^2 of the model is high. The value of 0.7728 shows 77.28% fit. The estimated parameter shows that education and membership of cooperative are significant at 5% level, while age shows a weak significance at lower level of significance (10%). Education parameter ($\beta = 0.0278$, $z = 1.98$, $P < 0.05$) is positive and significant at 5% level. The sign suggests that direct relationship exists between the level of education of the cocoa farmers and access to cooperative training. The result from the marginal effect estimate shows that additional increase in the level of education of the farmers increases their probability to seek cooperative knowledge by 2.8%. This finding

supports the idea educations enlightens an individual and support the ability and capability to interpret useful information for enhancement of livelihood outcomes. The more an individual gains greater access to education, the more the attention he or she pays to beneficial training from different sources including cooperative organisations. Membership of cooperative is positive and significant ($\beta = 0.1827$, $z = 3.46$, $P < 0.05$). The parameter estimate is positive and suggests a direct relationship between cooperative membership and access to training provided by the organisations. The marginal effect of the estimate shows that being a member of cooperative increases the probability of access to cooperative training by approximately 18.3%. Available evidence has shown that membership of organisations provides members with opportunities that are not available to non-members. This result is supported by Abukari, Zakaria and Azumah (2022). At 10% level of significance, age is found to be positive and significantly related to access to cooperative training ($\beta = 0.0027$, $z = 1.65$, $P < 0.10$). The result shows that as cocoa farmers become older, the probability of gaining to training opportunities provided by cooperative increases by 0.3%. Older farmers are expected to be more experienced, and have more exposure to beneficial opportunities on livelihood enhancing training.

Table 1: ***Estimated Determinants of Cocoa Farmers' Access to Cooperative Training***

Variable	Coef.	Std. Err.	z-value	dydx	z
Sex	-0.354	0.673	-0.53	-.0165	-0.52
Age	.0595	0.034	1.73	.0027	1.65*
HhS	.2535	.164	1.54	.0118	1.47
Edu	.5950	.284	2.09**	.0278	1.98**
Farm exp	-.007	.032	-0.24	-.0004	-0.24
Farmsize	-.118	.158	-0.75	-.0055	-0.74
Member_coop	3.911	1.018	3.84**	.1827	3.46**
Credit_access	0.391	0.737	0.53	.0182	0.53
Constant	-5.679	1.723	-3.30**		
LR chi2 = 119.00 Prob > chi2 = 0.000 Psudo R2 = 0.7728 Log likelihood = -17.494					

Note. Source: (Data Analysis, 2025).

The Estimated Effect of Training on Livelihood Capitals: The PSM Estimation: The estimated effect of cooperative training on the livelihood assets of the cocoa farmers (physical and financial capitals) of the cocoa farmers are thus presented in Table 2. The results indicate that training support from cooperative organisations has had a positive, direct and significant ($P < 0.05$) effect on the accumulated physical assets of the sampled cocoa farmers. The matching results indicate that the farmers who gained access to cooperative training were able to increase the values of their physical assets by ₦6,605.45 ($4.16) compared to the cocoa farmers without access to cooperative training. This value represents the mean difference in the values of the physical assets of similar pairs of cocoa farmers with different cooperative training access. The findings indicate that cooperative training exert greater impact in the livelihood physical assets of the farmers. Contrary results were obtained on the effect of the cooperative training on financial assets of the farmers. The training does not translate into more income (the measure of financial

assets). The estimated impact (ATT) of cooperative training on the financial assets of the farmers is negative with an equivalent reducing value of -₦1,551, 486.75 ($976.56). This is more plausible on the reason that more income from cocoa business is related to market prices. Since cocoa is an internationally traded commodity, fluctuation in prices may affect the financial gains.

Table 2: *Estimation of ATT: Effect of Cooperative training on Physical Capital*

	Value of Physical capital(₦)	Financial assets
ATT	6605.454	-1551486.75
Standard error	3058.246	805958.073
Treated	48672.121	4331220.57
Control	42066.667	5882707.32
t-stat	2.16**	-1.93*

Note. **, * means significant at 5% and 10%, respectively.

DISCUSSIONS

The findings of this study reveal that cooperative training exerts a positive and statistically significant effect on farmers' physical asset ownership. This outcome underscores the essential role that organized capacity-building programs play in strengthening farmers' productive resources. The findings of this study align with existing studies such as Oliveira *et al*., (2024). Cooperative training, by design, equips participants with knowledge related to improved farm management, efficient use of equipment, post-harvest handling, and investment decision-making. The finding is however contrary to the finding of Zeng and Weng (2024) who noted possibility of negative outcome from cooperative efforts. When farmers acquire these competencies, they are better positioned to expand and diversify their physical assets, such as farm tools, machinery, storage facilities, irrigation equipment, and crop production structures. The significant effect observed in this study suggests not only an increase in asset ownership but also a qualitative improvement in the types of assets cocoa farmers can access. The positive relationship can be interpreted within the broader framework of livelihood enhancement. Physical assets are fundamental to agricultural productivity; thus, greater ownership directly contributes to improved production capacity and resilience against shocks. Training empowers farmers to understand the economic value of physical capital and the long-term benefits of livelihood improvement. This agrees with the position of Zhang and Yang (2025) on the benefits of farmers' participation livelihood enhancing training. Additionally, cooperative settings often facilitate knowledge sharing, collective learning, and peer influence, which motivate farmers to adopt technologies and practices requiring physical investments. The cooperative environment may also enhance access to credit or group-based financing, enabling farmers to translate newly acquired knowledge into tangible asset accumulation. Furthermore, the significant effect of cooperative training aligns with existing empirical evidence suggesting that farmer education and capacity building stimulate technology adoption and productive asset acquisition. The role of structured training is particularly important in rural contexts where information asymmetry, low literacy levels, and financial constraints often hinder

farmers' ability to enhance their asset base. By reducing these constraints, training improves farmers' confidence and capability to obtain and maintain physical assets that support their agricultural enterprises. Overall, the positive and significant influence of cooperative training on physical assets demonstrates that such interventions are essential for strengthening farmers' livelihood systems. Investment in cooperative training programs thus holds considerable potential for rural development agencies, policymakers, and farmer organizations seeking to enhance productivity and long-term sustainability in smallholder agricultural systems.

CONCLUSION

The study evaluated the effect of cooperative training on the livelihood capitals of cocoa farmers. The findings of the study show that the farmers' cooperatives offer training services to farmers in the area of tools management, loan management and post-harvest processes. The significant factors that influence access to cooperative training by the farmers include level of education, membership status and age. Evidence from the effect estimates shows that the participants in cooperative training have more physical assets that could boost their livelihood outcomes. The training did not directly translate into better financial assets for the farmers. Cooperative training enhances the capacities of the farmers to acquire more physical livelihood assets. However, there is no significant evidence to show that cooperative training can provide direct benefit to the cocoa farmers in the area of increase in financial assets. The findings provide opportunities for further study on the drivers of financial asset acquisition among cocoa farmers. The finding may be limited by non-inclusion of unobserved variable such as risk preference of the farmers that may impart volume of assets acquired. The variation in training quality may also be part of the factors that may limit the application of the findings.

RECOMMENDATIONS

Given the positive and significant role of training in enhancing physical asset ownership, policymakers and development agencies should expand the coverage and frequency of cooperative training programs. Scaling up such training can enhance farmers' knowledge of equipment use, asset management, resulting in broader improvements in livelihood asset accumulation. To sustain effectiveness, a system of monitoring, evaluation, and standardization should be established to ensure that training content, duration, and delivery methods meet professional extension standards. Trainer competence should be improved through regular capacity-building. Also, farmers of different age category should be encouraged to get involved in cooperative activities to boost collective gain associated group involvement in livelihood enhancing activities.

Acknowledgement: The authors acknowledge the technical support received from the postgraduate team of the Department of Cooperatives and Rural Development, Olabisi Onabanjo University, Ago-Iwoye, Ogun State, Nigeria.

Conflict of Interest: There is no conflict of interest

REFERENCES

Bannor RK, Oppong-Kyeremeh H, Amfo B, Hope L, Kyire, SKC. (2022). The nexus between cocoa farmers' business schools participation and impact to support livelihood improvement strategies in Ghana. Sage Open, 12(2), 21582440221108170.

Bhukuth A, Roumane A, & Terrany B. (2018). Cooperative, human capital and poverty: a theoretical framework. Economics & Sociology, 11(2), 11-18.

CBN (2023). Central Bank of Nigeria Report.

Gashaw BA, Kibret SM. (2018). Factors influencing farmers' membership preferences in agricultural cooperatives in Ethiopia. American Journal of Rural Development, 6(3), 94-103.

Kehinde AD, Ogundeji AA. (2022). The simultaneous impact of access to credit and cooperative services on cocoa productivity in South-western Nigeria. Agriculture & Food Security, 11(1), 11.

Mohammadi A, Omidi NM, Poursaeed A. (2023). A comprehensive sustainable development framework; community capitals and village-cooperative initiative. Brazilian Journal of Biology, 84, e269509.

Natarajan N, Newsham A, Rigg J, Suhardiman D. (2022). A sustainable livelihoods framework for the 21st century. World Development, 155, 105898.

Nderitu MW, Gakobo TW, Ochieng I. (2019). Effect of human capital management on employee performance at the Co-operative Bank of Kenya. Human Resource and Leadership Journal, 4(2), 21-40.

Oduro-Owusu AY, Appiah P, Tham-Agyekum EK, Ankuyi F, Addison A, Asirifi S, Bakang JEA. (2024). Determinants and outcomes of participation in decision-making in cocoa farmer cooperatives. Rural Society, 33(2), 116-137.

Oliveira BSC, Weymer A, Piccoli P, Ramos SC. (2024). The relationship between training effectiveness and financial performance in cooperative organizations. Social Enterprise Journal, 20(3), 391-415.

Sofoluwe NA, Yinusa, GO. (2021). Impact of cooperative membership on rural income generation in Southwest, Nigeria. REVESCO: Revista de Estudios Cooperativos, (138), 140-152.

Sofoluwe, NA. (2019). Effect of democratic control and ownership dimensions on performance of agricultural cooperatives in rural Nigeria. Malaysian Journal of Cooperative Studies, 15, 95-107.

Uddin ME, Pervez AK, Gao Q. (2022). Effect of voluntary cooperativisation on livelihood capital of smallholder dairy farmers in the southwest of Bangladesh. GeoJournal, 87(1), 111-130.

Zeng L, Wan, J. (2024). How do cooperative rebates and asset specificity impact operating performance of farmer cooperatives? evidence from China. PloS one, 19(11), e0313483.

Zhang H, Yang M. (2025). Does farmers' participation in skills training improve their livelihood capital? An empirical study from China. Agriculture, 15(7), 679.

.