

Measuring the impacts of cooperative membership on household income: A case study of Zanzibar

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Background: It is commonly acknowledged that cooperatives play important social functions that raise the standard of living for their members, particularly those who originate from rural, and low-income backgrounds.

Aim: This article aims to measure the impacts of cooperatives membership on household income taking Zanzibar as a case study.

Setting: The data used were directly collected from 217 cooperative members and 83 non-cooperative members.

Method: Descriptive statistics were used to analyse the demographic characteristics of the respondents. The probit model and propensity score matching (PSM) was used to analyse the impacts of cooperative membership on household income.

Results: The probit model findings show that there are four statistically significant factors affecting cooperatives membership, including gender, educational level, land ownership, and access to credit. In addition, PSM findings reveal that there is a disparity in income level between cooperative members and non-members. On average, cooperative members are able to generate more income than non-cooperative members by 28% per year.

Conclusion: The study concludes that, in order to expand the observed benefits to the population, cooperative growth needs proper backing. Because poverty has many different dimensions, it's crucial to expand the organisations that help the poor while also utilising other support services to reduce it.

Contribution: The article serves as first empirical evidence to be conducted in Zanzibar, Tanzania. The findings will facilitate the amendment of the cooperative context, including tax reduction, extending loans and grants, and other favourable working conditions necessary for supporting the development of cooperative society.

Keywords: cooperatives; household income; probit model; propensity score matching; Zanzibar.

Introduction

It is commonly acknowledged that cooperatives play important social functions that raise the standard of living for their members, particularly those who originate from disadvantaged, rural, and low-income backgrounds. Cooperative societies provide institutional framework that integrate capital, assets, and people into an economic unit, and support their way of life (Fernandez-Guadaño, Lopez-Millan & Sarria-Pedroza 2020). Additionally, cooperatives frequently provide opportunities for rural farmers and the needy in urban areas to raise their income. Cooperatives are democratic businesses that provide members the freedom to come up with their own ideas. They improve members' financial security and support gender equality both directly and indirectly (Quilloy 2018).

In total, cooperative societies employ 10% of the world's working population and generate nearly \$2.2 trillion in revenue (International cooperatives alliance [ICA] 2022). The cooperatives are currently viewed as the most effective path to transformational development because they put people in control of their own destinies and help to provide facilities to their community. They also increase decision-making, trust, and accountability through autonomous participation (Abbas 2016).

According to Apostolakis and Dijk (2019) objectives of cooperatives are to maximise member benefits while dropping differences in income and expenditures, such as in-service markets, economic growth, consumer products, and the enhancement of member quality of life. The cooperative movement in developing nations, particularly in sub-Saharan Africa, has a different experience than that of wealthy nations because of Africa's distinctive history, socio-political backdrop, and chronically high level of poverty (Kaleshu 2018). To tackle all facets of underdevelopment, cooperatives were established throughout the continent. For instance, in countries such as Kenya, Ethiopia, and Rwanda, agriculture cooperatives are third-sector organisations that are utilised to get over other barriers that prohibit poor households from taking part in industrialised poverty alleviation (Feisali & Niknami 2021).

Zanzibar aspires to achieve middle-income status by 2020, just like other African nations, through modernising its economy and enhancing the quality of life for its people. The overarching goal of Zanzibar Development Vision 2020 is to develop Zanzibar into a middle-income country (ATI 2010). The enhancement of social well-being, effective governance, and achieving sustainable growth that raises income and lowers non-income poverty for the majority of Zanzibaris are the main objectives of the vision. Economic strategies that support the provision of essential social services, improve job, educational opportunities, and encourage participatory development are necessary for the development vision to be successful (ATI 2010).

Zanzibar Development Vision 2020 specifically acknowledged cooperative societies as a crucial tool for fostering job creation, income generation, resource mobilisation, and broad-based economic development. The government has been eager to establish regulations for cooperative development that will allow these organisations to help their members and communities achieve their development objectives and lessen poverty (Issa 2020). According to the information that is currently available, Zanzibar has 1701 primary cooperative societies with 19540 registered cooperative members. Therefore, cooperatives can be viewed as the best system for enhancing revenue and are essential to the growth of the economy. Few research, particularly in the Zanzibar context, has examined the effect of cooperatives on household income. Therefore, the study aims to highlight the impacts of cooperative membership on generating household income. Understanding how cooperative membership affects income creation is still essential because it is a key component of the approach to reducing poverty. The study will add to the continuing discussions about cooperatives' potential as an economic and social institution for boosting wealth through income accumulation.

Literature review

The cooperative concept was first created in Rockdale, England, in the late 18th and early 19th centuries in order to

help people with low incomes make a living. It is still utilised as a successful method by corporations and governments to assist their personnel in advancing their careers (Sambuo 2023). The model serves both economic (such as reducing poverty) and social (such as eradicating poverty) problems, which is a unique dual purpose (Muthyalu 2015). A cooperative society is an autonomous group of individuals that come together voluntarily to address their shared economic, social, and cultural concerns. This is accomplished by a jointly owned and democratically run business (ICA 2022). Attending cooperatives is predicted to improve a member's performance in terms of their economic and lifestyle standards. The following studies are considered representative of the impact of cooperatives on social issues.

Vuong et al. (2021) on the analysis of changes in income reported that 25% of households that were largely below the poverty line were able to escape poverty after enrolling in an unofficial finance programme. The household income of regular clients is also larger than that of new clients. Members' incomes rose in comparison to their pre-cooperative income levels, which aids in the fight against poverty.

Li and Zhang (2023) emphasised the ways in which cooperatives increased operational income by participating in goods such as priority sales, wage income by participating in labour such as employment, property revenue by participating in assets like farmland, and transfer income by participating in projects like project investment.

Effiom (2015) carried out the research project, 'Effect of membership of cooperative organisations and determinants on farmer-members' income in rural Anambra state of Nigeria'. Using a multi-stage stratified random sampling; data from 2506 members were used in the study. The study emphasised how a person's socioeconomic profile that includes factors such as age, marital status, membership in cooperative organisations, education, cooperative marketing, credit, gender, and business skills, affects their income. The majority of respondents in the study area placed a significant emphasis on earning money from farming-related activities. Inadequate money, inadequate education and illiteracy among the majority of members, conflict among members, and a lack of access to farm input were all found to be the top obstacles for the farmer-members.

Ethiopian researchers Getnet and Anullo (2012), looked into rural probabilities and agricultural cooperatives. The study's data were gathered from 212 randomly chosen farm households in the Boricha district of the Sidama Zone of the Southern Nations, Nationalities, and Peoples Region (SNNPR) (99 of which utilised cooperative services and 113 of which did not). In this study, the impact of agricultural cooperatives on people's livelihoods in Ethiopia's Sidama region was examined. It accomplished this by applying the Propensity Score Matching (PSM) approach on the indicator variables of rural household income, savings, input spending on agriculture, and asset accumulation. The research showed that cooperatives enhanced service user farmers' livelihoods

by increasing income, increasing savings, and lowering input costs. It is advised to further promote, develop, and support agricultural cooperatives in light of this information.

However, being a cooperative's member does not necessarily lead to the improvement of household's income. For instance, a cooperative association may lack strong leaders who can advance the development of the group and improve the welfare of the members. Consequently, member performance can be decreased as opposed to improving (Xu, Liang & Huang 2018). On the contrary, if the cooperative leaders are knowledgeable and enthusiastic, joining the association is likely to increase household income. Therefore, this study examines how cooperative membership affects household income differently for members who have access to and don't have access to cooperative activities.

Research methods and design

Data collection

A multistage sampling technique was employed for the data collection. In the initial stage, first 10 districts of Zanzibar were purposefully chosen as an area of study. In the second stage, active registered cooperatives with 5 years of experience were purposefully chosen as the sample population of the study. The choice of active registered cooperatives was made in order to avoid false cooperatives sustained for a short period of time. According to a preliminary survey conducted between June and March 2023, there are typically 100 registered cooperative societies that are active and in operation in each district, with an average membership of 15 people. Out of 1000 cooperatives in 10 districts, three were chosen at random from each district for a total of 30 cooperatives. In the third stage, a total of 10 cooperative members were selected from the list of 30 cooperative societies obtained in the second stage. As a result, 300 respondents were selected from 30 cooperatives to participate in the impact survey questionnaire. This number of respondents was sufficient, according to Kothar (2004), who argued that 80–120 respondents are adequate for most socio-economic studies.

Lastly, to measure the impact of cooperative membership 217 respondents who had been members of cooperatives for at least 6 months were purposively selected as the treatment group (a cooperative member), and 83 respondents who joined cooperatives less than 6 months ago were purposively selected as the control group (non-cooperative members). The use of members and non-members as comparison groups helps to reduce self-selection bias because they also elected to join cooperatives (Yacob et al. 2018). In order to get appropriate answers to the questions, the questionnaire was translated into the respondents' native tongue (Swahili). A descriptive analysis was used to analyse the demographic characteristics of the respondents. An econometric model, as explained below, was used to measure the impact of cooperatives on household income.

Econometric model

Impact measurement necessitates a meticulous analytical technique. The endogeneity of programme participation in the output function presents a significant challenge in assessing the effect of membership on income. Because of unobserved qualities such as higher-than-average motivation for better income or aptitude in commercial activities, selection bias may exaggerate the impact of these factors. The PSM method is used in this work to examine the possible consequences of participating in the cooperatives in the research region while overcoming endogeneity. The technique used has two logical estimating steps. Firstly, a probit model evaluates the propensity score, or the likelihood that the households will have access to cooperatives. Secondly, a matching method is used to quantify the difference in outcomes between members and non-members while accounting for propensity scores. This process ensures that a member and a non-member are compared using the same criteria.

Propensity score matching

When treatment assignment is not random but can be considered to be unconfounded, the propensity score is used to provide an alternate way for estimating treatment effects, as first proposed by Rosenbaum and Rubin (1983). According to Caliendo and Kopeinig (2008), the propensity score is the conditional likelihood of treatment given the background variables. Based on the likelihood of participating in a cooperative society, the PSM model aids in the construction of a statistical comparison group. As a result, non-members and members of cooperative groups are matched based on personal and socioeconomic traits (Caliendo & Kopeinig 2008). The impact of cooperatives is then estimated using the difference in mean income between the comparison groups. To determine the propensity score (E) for the likelihood of belonging to a cooperative, the researchers utilised a probit model that incorporates a number of conditioning factors (X) that are likely to explain membership behaviour and the not-random distribution of participation in the sampled population. The average treatment effect on the treated (ATT) for the treated (members or participants) population is the primary parameter of interest in PSM (Becker & Ichino 2002). Thus, the following is provided as the PSM non-parametric model (Equation 1):

$$\begin{aligned} \text{ATT} &= E(Y_{i,1}|D_i=1) - E(Y_{i,0}|D_i=1) & [\text{Eqn 1}] \\ &= E(Y_{i,1}|D_i=1) - E(Y_{i,0}|D_i=0) \\ &\quad + E(Y_{i,0}|D_i=0) - E(Y_{i,0}|D_i=1) \end{aligned}$$

Where, $y_{i,1}$ is the outcome of interest for households taking part in cooperatives (members) and E indicates the expectation operator. D_i is a binary indicator that equals 1 if the members join in cooperatives and 0 otherwise. $Y_{i,0}$ is the result of the same household not participating in cooperatives (non-members). We are unable to simultaneously observe $E(y_{i,1}|D_i=1)$ and $E(y_{i,0}|D_i=1)$ for the same home when estimating ATT. If membership in the cooperatives is not

chosen randomly and is conducted by the members' own initiative, a straightforward comparison between the treatment group and control group involves selection bias, whose magnitude is shown in $E(y_i, 0 | D_i = 0) - E(y_i, 0 | D_i = 1)$.

Probit model

The dichotomous dependent variable's behaviours are explained by the probit model. The probability estimate in the probit model is based on the cumulative distribution function and is predicated on the normality assumption (CDF) (Gurajati 2003) and is computed as (Equation 2):

$$P_i = P(Y = 1/X) \quad [\text{Eqn 2}]$$

$$= P(I^* \leq I_i)$$

If I_i is more than I^* , a person is a member of a cooperative society; if I_i is less than I^* , a person is not a member of a cooperative society. I^* signifies the threshold level of the probability index. The study probit model could be defined as follows given the values of X such that G_i is the normal study variable and is the parameter to be estimated (Equation 3):

$$\Pr(Y = 1/X) = \Phi(xb) \quad [\text{Eqn 3}]$$

Φ denotes the standard cumulative distribution under the normal probability assumption, while xb is the probit index.

In explicit form (Equation 4):

$$P_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \epsilon_i \quad [\text{Eqn 4}]$$

Ethical considerations

Ethical clearance to conduct this study was obtained from the Revolutionary Government of Zanzibar, Secretary Zanzibar Research Committee (Project Research Number: HB21GL006 and Ethical Clearance No. 610126E386840).

Result and discussion

As presented in Table 2, the majority of cooperative members were in the age range of 41–50 years old, compared to the majority of non-members, who were in the age range of 31–40 years old. This suggests that

cooperative membership is more appealing to adults. However, there is an influx of youth under the age of 30 across both groups of respondents. The reason behind this is because of the increase in government incentives for supporting cooperative development following the coronavirus disease 2019 (COVID-19) pandemic. The gender distribution of respondents is skewed for both groups. There are more female members in cooperatives compared to non-members. This is because men prefer to work in highly paid jobs with immediate effect rather than in groups. For both groups, the majority of respondents attained a secondary level of education: 55.0% for cooperative members and 53.0% for non-members. In addition, only 3.2% of members and 3.6% of non-members have any formal education qualifications. This implies that the majority of cooperative respondents have a minimum level of education. For both groups, household size ranges from four to six people, with 46.0% being members and 40.9% being non-members. This implies the extended family size of the cooperative's respondents.

Test of significance on demographic variable between members and non-members (*t*-test)

The author intends to determine, if there are significant differences between the two groups on demographic variables. To accomplish this *t*-test was applied as reported in Table 3.

Impact of cooperatives membership on household income

Estimated result probit model

To control for factors affecting participation in the cooperatives, we calculate the propensity score for participation in the cooperative by employing probit models. The dependent variable is a binary that is 1 if households join the cooperative and 0 otherwise. The independent variables consist of age, gender, marital status, educational level, land ownership, household size, and access to credit, as explained in Table 1 and Table 4.

As can be seen from the Table 4, the predictability and significance level of the model are quite good. The *p*-value of gender, educational level, land ownership, and access to

TABLE 1: Description and measurement with a prior expectation of the variables.

Variable	Description	Measurement
Dependent variable:		
P_i = Coop member	Status of membership	Dummy (1 = member, 0 = non-members)
Independent variable:		
X_1 = Age	Age of respondents	Years
X_2 = Gender	Sex of respondents	Male = 1; Female = 0
X_3 = Marital status	Current status of marriage	Continuous
X_4 = Educational level	Years of schooling	Years
X_5 = Household size	Household size	Number of people residing under the same roof
X_6 = Land ownership	Ownership land	Yes = 1; No = 2
X_7 = Access to credit	Access to credit services	Yes = 1; No = 2
Outcome variable:		
Household income	Annual income of household	Amount of household income received in a year (Tanzania Shillings).

TABLE 2: Demographic characteristics of the respondents ($N = 300$).

Variables	Value	Members ($n = 217$)		Non-members ($n = 83$)	
		Frequency	%	Frequency	%
Age (in years)	21–30	59	27.0	22	26.5
	31–40	56	25.0	39	46.9
	41–50	66	30.0	13	15.6
	51–60	26	11.9	7	8.4
	61–70	8	3.6	1	1.2
	>71	2	0.9	1	1.2
Gender	Male	107	49.3	51	61.4
	Female	110	50.6	32	14.7
Marital status	Married	179	82.4	54	65.0
	Widow	14	6.4	14	15.6
	Single	24	11.0	16	19.2
Educational level	None	7	3.2	3	3.6
	Primary education	43	19.8	12	14.4
	Secondary education	120	55.0	44	53.0
	Vocational training	10	4.6	9	10.8
	University	37	17.0	15	18.0
Household size	1–3 (people)	20	9.2	14	16.8
	4–6 (people)	100	46.0	34	40.9
	7–9 (people)	66	30.4	23	27.7
	More than 9 peoples	31	14.2	12	14.4
Land ownership	Yes	38	17.5	23	27.7
	No	17	7.8	4	4.8
Access to credit	Yes	144	66.3	38	45.7
	No	73	33.6	45	54.2

TABLE 3: Test of significance on demographic variable between members and non-members (t -test).

Variable	Levees test for equality of variance			t -test for equality of means			Standard error difference
	F	Sig	t	df	Sig (2-tailed)	Mean difference	
Age	8.74	0.00	1.880	298	0.06	0.270	0.14
Gender	25.30	0.00	2.440	298	0.01	0.150	0.06
Educational level	3.90	0.04	-0.790	298	0.43	-0.110	0.14
Marital status	12.53	0.00	2.570	298	0.01	-0.350	0.13
Household size	1.19	0.28	0.890	298	0.37	0.100	0.11
Land ownership	8.88	0.00	-1.650	298	0.09	-0.090	0.05
Access to credit	39.60	0.00	8.280	298	0.00	-0.480	0.00

Note: The statistical test results in Table 3 reveal that the groups are similar in age ($p = 0.06$), educational level ($p = 0.43$), land ownership ($p = 0.09$), and household size ($p = 0.37$). There are significant differences between members and non-members on three variables, namely gender ($p = 0.01$), marital status ($p = 0.01$), and access to credit ($p = 0.00$), Significance at 5%.

F , F -value; Sig, significant level; t , t -test; df , degree of freedom.

TABLE 4: Factors affecting cooperatives membership (probit models).

Variable	Coefficient	SE	Z	p
Age	-0.063	0.085	-0.73	0.464
Gender	0.335**	0.175	1.91	0.052
Marital status	-0.018	0.082	-0.22	0.823
Educational level	-0.146	0.079	-1.85	0.065
Household size	0.161	0.098	1.63	0.103
Land ownership	0.430**	0.192	2.24	0.025
Access to credit	0.402***	0.199	7.06	0.000
Constant	3.452	0.609	5.67	0.000
LR Chi ² (7)	74.200	-	-	-
Prob > Chi ²	0.000	-	-	-
Pseudo R^2	0.209	-	-	-
Log likelihoods	-139.830	-	-	-

SE, standard error.

***, $p < 0.01$; **, $p < 0.05$; *, $p < 0.1$.

credit are all statistically significant at 5% and 10%, and show a considerable effect on the ability to join cooperatives. The impact of these four independent variables on the ability of households to take part in a cooperative can be explained as follows:

As shown in Table 4, variable gender has a positive coefficient ($\beta = 0.3351$) and significantly relates to the decision of households to join cooperative societies. This implies that female household members are more likely to join cooperatives compared to male household members. This is because of the fact that male participants are attracted to working in an enterprise that can have an immediate effect and decide not to join cooperatives that delay fulfilling the immediate change. This result is consistent with Afolabi and Ganiyu (2021) found more female (72%) than male (27.8%) in rural cooperatives of Nigeria. Rural urban migration of male youths to cities could be one of the reasons for gender composition in Nigerian cooperatives. In addition, Mbarouk et al. (2018) found that agricultural cooperatives in Zanzibar are dominated by women and older people.

Moreover, Table 4 reveals that variable educational level shows a negative coefficient ($\beta = -0.1464$) with significantly above 5% relating to the decision to join cooperatives. This implies that as the level of education increases, the

decision to join cooperatives decreases. As a result, the majority of cooperatives are dominated by members with low and medium levels of education. People with the highest level of education decide to look for jobs with the highest pay to sustain their living conditions instead of joining cooperatives. This result contradicts Atanaw and Gebeyehu (2018) who found a positive relationship between educational level and the decision of farmers to join cooperatives in Vietnam.

In addition, a positive coefficient for variable land ownership ($= 0.4302$) is present and significant at 5% for the choice to join cooperative groups. Members possess a variety of types of land, including residential, agricultural, and garden land. Participation in local production models, cooperative organisations, and other welfare development options is strongly influenced by land usage. Owners of land are simply able to join production groups and diversify their crops, increasing their income. This empirical finding is in accordance with previous studies conducted by Abbas (2016), Anania and Rwekaza (2018), and Afolabi and Ganiyu (2021). These authors also stated that the area of land owned and the ability to access cooperative groups positively influence the income and expenditure of households.

Furthermore, Table 4 shows that the likelihood of people joining cooperatives is highly correlated with access to credit, with a positive correlation ($= 0.4029$). This implies that the likelihood of household membership in cooperatives also increases with increased access to financing through cooperatives. This discovery is comparable to one made by Nwankwo, Ewuim and Asoya (2012) who discovered that in rural Nigeria, access to finance is positively and significantly (5%) correlated with the likelihood of joining cooperative organisations. The study did not discover any appreciable effects of age, marital status, or household size on the likelihood of households joining cooperatives. The ability of households to join in a cooperative society in Zanzibar cannot be determined by these variables, as the p -value for each of their coefficients is relatively high.

Estimated result of propensity score matching

The estimation results of the probit model shown in Table 4 are crucial proof that the likelihood of a household's membership in Zanzibar's cooperative society is highly influenced by factors such as gender, educational attainment, land ownership, and credit availability. Average treatment effects on the treated is estimated using PSM based on the propensity score calculated from the probit model (Caliendo & Kopeinig

2008). Household income, a dependent variable, is used to gauge the impacts. By bootstrapping with 500 replicants, the PSM standard errors are obtained. The researchers apply common support and set balancing features to assure the elimination of any potential bias in the estimate (see Figure 1). At a 5% level of significance, the common support and balancing properties were both fulfilled.

Table 5 displays the estimated PSM outcome. The ATT are calculated using the findings of the paired comparison. According to Becker and Ichino (2002), the income disparity between the group of households engaging in the cooperative's activities and the group of households not participating is the ATT. The analytical findings for three matching techniques are favourable and significant at 5%. Because of the matching and replacement steps taken by the caliper technique and kernel method, the three approaches differ from one another. Despite the fact that both results are encouraging, the kernel technique was chosen for interpretation because it has a smaller standard error. Cooperative members are often able to produce 28% more money annually than cooperative non-members. This empirical finding suggests that the participants who are cooperative members have benefited from having access to better agricultural production models, training in farming methods and entrepreneurship skills, guaranteed prices for output products, reduced agricultural production costs, and guaranteed financial services, all of which have a significant impact on household income growth. This result is comparable to that of Vuong et al. (2021), who discovered that, at a 1% level of significance, the average household income of cooperative members in Vietnam is roughly 40880 m/VND more than that of non-members. Furthermore, according to empirical data from a household survey

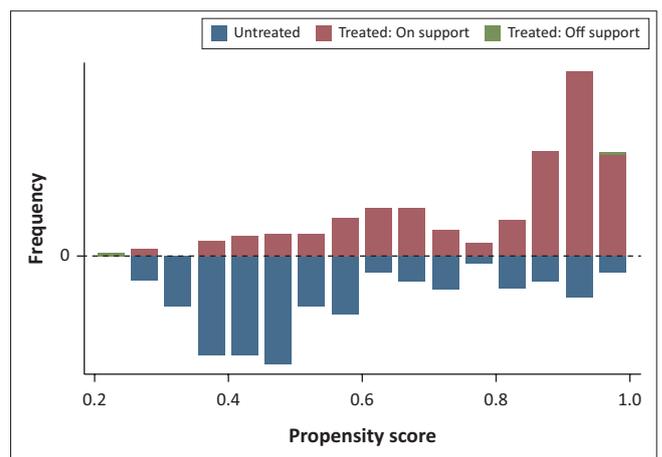


FIGURE 1: Effect of cooperative membership.

TABLE 5: Impact of cooperatives on household income propensity score matching result.

Outcome	Method	ATT	SE	t	No. of observation
Household Income	Nearest neighbour matching (4)	0.29	0.175	1.66**	300
	Radius caliper matching (0.03)	0.22	183.000	1.16**	299
	Kernel matching	0.28	0.168	1.69**	299

ATT, average treatment effect on the treated; SE, standard error; t , t -test; No., number.

***, $p < 0.01$; **, $p < 0.05$, *, $p < 0.1$.

conducted in China by Zou and Wang (2022), farmers who joined professional cooperatives made much more money on average than their rivals. Thus, it is evident that cooperatives have a favourable impact on household income. In other words, taking part in the production and operations of these cooperatives greatly enhances and stabilises household income.

Conclusion

This study explores the variables influencing households' likelihood of joining cooperative organisations and the effects that membership has on the income of farm households in Zanzibar, Tanzania. Data for the study are provided by 300 households in the study area that underwent direct surveys. The probit regression model and PSM approach were used in this study, which discovered that four variables – gender, land ownership, access to credit, and education level – significantly affect households' capacity to engage in cooperatives at significance levels of 10% and 5%, respectively. The other factors, such as marital status, household size, and age, have little to no impact on a home's ability to engage in a cooperative. In addition, the PSM method's analytical findings show that there is an income discrepancy between households that join non-member cooperatives and those that do not. The average annual income difference between cooperative members and non-members is 28%, with a statistical significance level of 5%.

A study contends that the creation of wealth (income) through cooperatives can make future efforts to eradicate rural poverty simpler based on the presented empirical facts. The conclusion for policy is that cooperative growth requires enough assistance to increase the observed benefit to the population. It is essential to increase the number of organisations that assist the poor while also utilising other support facilities to minimise it, given the complexity of poverty. The study's findings also suggest that politicians involved in social change and development should incorporate self-help organisations into their development strategies. This will allow them to allocate scarce resources efficiently, especially to the most vulnerable populations in rural and urban areas. Cooperative paths can also improve the way development support groups use their funding.

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Competing interests

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

Authors' contributions

M.J.A. contributed in preparing the article, data collection and analysis, G.Q. was involved in reviewing and editing the manuscript, and G.W. contributed in reviewing the article and data analysis.

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Data availability

The data that support the findings of this study are available from the corresponding author, G.W., on reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors, and the publisher.

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