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Does women's engagement in sunflower commercialization empower them? Experience from Singida region, Tanzania

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ABSTRACT

Empowering women within sunflower value chains can create significant development opportunities for them and generate benefits for their families. This paper asks whether women's engagement in sunflower commercialization influences their levels of empowerment. The paper uses data from a 2018 study conducted by Agricultural Policy Research in Africa. A cross-sectional research design was used, and data were collected using mixed methods involving primary, qualitative, and quantitative methods as well as secondary data from the literature. A total of 600 farm household heads and 205 focus group participants (7–15) from 15 villages were selected for the study. Qualitative and quantitative data were subjected to content and econometric analysis respectively, with the help of Microsoft Excel and Statistical Package for the Social Sciences programs. The findings revealed that female household heads tend to benefit less than men from sunflower commercialization. Sunflower commercialization had a positive but insignificant influence on women's empowerment: the study found that low levels of access to and control over productive resources resulted in low agricultural productivity, which affects empowerment levels. However, household commercialization involving all crops did have a positive and significant impact on the empowerment of women because non-cash crops were more likely to be retained by women, even when commercialized. This calls for policies that support and promote a diversified portfolio of livelihood options for women farmers in Singida region.

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Introduction

It has been repeatedly stated that women play a crucial role in agriculture and the economic development of many African countries. Often, women are key producers of

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food crops for household consumption (Food and Agriculture Organization [FAO], 2019). In recent decades, women's engagement in agricultural commercialization has featured prominently in the fight to improve food, income and poverty reduction for their family. Yet, women's participation in crop commercialization has a gender dimension that often undermines the benefits of this participation (Jeckoniah et al., 2020). For example, there is increasing concern in the literature that agricultural commercialization could potentially marginalize women who intensify their production, since men tend to take control over the decision-making of sales and use of any income, especially for commercial crops, which usually fall under the male domain (Diirro et al., 2018; FAO, 2019; Farnworth et al., 2020; Forsythe et al., 2016; Njuki et al., 2011; Orr et al., 2016; Varley, 2018). In addition, commercialization that is associated with agricultural intensification and adoption of improved technologies also often further reduces the role of women (Sell & Minot, 2018; Tsusaka et al., 2016). Despite these claims, it is still generally considered that women's engagement in commercialization is important (Isinika & Jeckoniah, 2021; Orr et al., 2016; Tsusaka et al., 2016).

In Tanzania, women's engagement in agricultural commercialization has been increasing and there is greater recognition of the importance of women maintaining control over specific cash crops such as banana, groundnuts, sunflower, and paddy (Orr et al., 2016; Quisumbing et al., 2014). Commercialization of horticultural and other cash crops has been associated with significant livelihood improvement and poverty reduction in many African countries including in Zambia (Orr et al., 2016), Tanzania (Isinika & Jeckoniah, 2021; Jeckoniah et al., 2020), Uganda (Alkire et al., 2015), Kenya (Muriithi & Matz, 2015), Burkina Faso (Varley, 2018), and Nigeria (Peterman et al., 2011). For example, prior to commercialization, sunflower processing in Singida region was controlled by women to provide oil for domestic use and limited sales within communities to neighbors and friends. Women controlled the proceeds from such sales. There is reason to believe, however, that commercialization of sunflower as a priority crop in Singida region may not lead to positive impacts and women's empowerment. It may lead instead to women's disempowerment as it has happened when other crops were similarly commercialized—widening gender inequality, in terms of women's workload, power, and land rights (Orr et al., 2016).

Sunflower production has a long history in Tanzania, particularly in Singida and Dodoma regions, where it is among the most popular crops, next only to maize. The majority (70%) of farming households in Singida produce sunflower as a cash crop (ANSAF, 2019; Bank of Tanzania, 2017), and its production has been growing significantly for the past two decades since 2000 (Mgeni et al., 2018). Production doubled from 37% in the 2002/2003 cropping season to 71% in 2007/2008 but declined thereafter (Isinika et al.). Women's participation in sunflower commercialization has also become popular because the income earned enables them to engage in other farm and non-farm activities, thereby improving their bargaining power with other actors, not only along the sunflower value chains but within households and communities as well.

Empowering women and girls is among the key objectives of Tanzania's national gender policy. The analysis revealed that in some villages women have better control over income from sunflower than men, especially when their involvement extends to

decision-making in processing and marketing (Isinika & Jeckoniah, 2021). Their growing involvement in sunflower processing and marketing in local markets has not only improved the survival of their families but it has also helped them improve their networking ability and contributed to reducing gender bias (Jeckoniah et al., 2020).

While aggregate data are available on the social and economic benefits of sunflower production and commercialization in Tanzania, the extent of women's empowerment through engagement in sunflower commercialization has not been adequately explored. The general objective of this paper was to assess the extent of women's empowerment in sunflower commercialization in Tanzania using the case of Singida Region, which is famous for sunflower production, processing and marketing. The paper used data collected from Singida Region for an Agricultural Policy Research in Africa (APRA) study assessing commercialization pathways along a longitudinal perspective. The paper is organized in three main sections. The next section describes the research methodology. This is followed by presentation of the findings and discussion. The last section summarizes lessons learnt and policy implications.

Research methodology

Study areas, sampling procedure, and data collection methods

The paper uses quantitative and qualitative data collected from Iramba and Mkalama districts in Singida region for a longitudinal study under APRA to assess sunflower commercialization pathways and livelihood outcomes.

Singida region is located in the central zone of mainland Tanzania, between latitude $30^{\circ} 52'$ and $70^{\circ} 34'$ south of the equator, and longitudes $220^{\circ} 27'$ and $350^{\circ} 26'$ east of Greenwich. The region was purposively selected for the study due to its long history (since 1970) of sunflower production. The region has six districts: Singida rural, Itigi, Manyoni, Mkalama, and Iramba. Among these districts, Iramba and Mkalama were selected out because they have been leading in sunflower production, accounting for about 50% of total production of sunflower from the region (National Bureau of Statistics, 2017; United Republic of Tanzania [URT], 2016, 2020). Eight villages (Kidaru, Wembere, Tyeme, Mugundu, Mgungia, Ng'ang'uli, Luono, and Zinziligi) are located in Iramba District, while the other seven (Dominiki, Nkalakala, Kisuluiga, Nduguti, Lukomo, Isene, and Mwanga) are in Mkalama District. The household was used as a unit of analysis. Within each village 40 households were selected randomly for a household survey, from the population of sunflower producing farmers, making a total of 600 households.

The study used a mixed methods approach for data collection and analysis. To increase the validity and precision of the data, triangulation was adopted, which involved combining a household survey, focus group discussions (FGDs), key informant interviews and a literature review. The qualitative data were collected through FGDs and key informant interviews in October 2018, concurrently with the household survey to gather quantitative data. The FGDs involved 7–15 villagers per village, who were selected to represent a diversity of gender, age, and spatial coverage across each of the 15 sample villages, making a total of 205 participants (23% female and 77% male). In addition, key informant interviews involved 137 respondents (24% female and 76%

male) including village leaders, government employees, traders, processors, as well as elders and opinion leaders who were identified by the FGD participants. The quantitative survey involved 600 households (13.6% female-headed and 86.4% male-headed).

Analytical framework

Descriptive analysis

The Microsoft Excel and Statistical Package for the Social Sciences (SPSS) programs were employed for data analysis. Content analysis was used for qualitative data. It involves comparison techniques, whereby information is transcribed verbatim and organized into themes that represented the sub-topics under study. Emerging themes were then organized, compared, and used in the discussion of the findings.

Determining the effect of sunflower commercialization on women's empowerment

In order to determine the effect of sunflower commercialization on women's empowerment, first the Sunflower Commercialization Index (SCI)¹ was computed followed by the computation of the levels of women's empowerment for each household. We also assessed the influence of crop commercialization by establishing the Household Crop Commercialization Index (HCCI) and comparing this against the levels of women's empowerment. We did this in order to compare the results from SCI and HCI, relative to women's empowerment. Based on the findings, policy recommendations are made. Computation of the two indices are described below.

Measuring sunflower and household crop commercialization indices. SCI was computed as a percentage of sunflower that is marketed out of what was produced, while HCCI was developed by computing the percentages of all crops that were marketed. This methodological approach has been recommended by other scholars including Muriithi and Matz (2015), and Von Braun (1994, as cited in Cazzuffi et al., 2018). The SCI and HCCI can be expressed either in proportions or in percentages, and both forms of presentation lead to a continuous interval from 0 to 1 for proportions, or 0 to 100 in the case of percent with both limits included. Zero means nothing was sold, and 1 as a maximum (or 100) means that the entire sunflower or crop product was sold. Comparison of these indices was made across categories including farm size, sex, and level of empowerment.

Measuring women's empowerment. The level of women's empowerment in this paper was established by using two approaches. First, we used the mean score of the proxy indicators, which included women's bargaining power in decision-making, and access to and control over assets (land ownership) and income. The second proxy indicator measured the attainment of food security and participation in collective actions. The mean scores from each proxy indicator were used to construct a composite Women's Empowerment Index (WEI) scale. As in the case of SCI and HCCI, the scores from the WEI can be expressed either as proportions (0 to 1) or as percentages (0 to 100). This categorization is in line with Human Development Index guidance (Alkire & Santos 2013, p. 19; United Nations Development Programme, 2018, p. 123)

Table 1. Mean land area (ha) under sunflower production in 2017/18 ($n = 600$).

Item	Farmer category					
	Farm size category			Sex of household head		
	SSF	MSF	Significance of difference	MHH	FHH	Significance of difference
Mean land area	0.9	2.5	$F = 135.2^{***}$	1.3	0.7	$F = 8.0^{***}$
Median	0.8	2.0		0.8	0.4	
Minimum	0.01	0.2		0.01	0.1	
Maximum	4.15	18.2		18.2	3.6	

SSF: small-scale farmer; MSF: medium-scale farmer; MHH: male-headed household; FHH: female-headed household.
Source: APRA survey data, 2018.

where the score on the Human Development Index also varies between the value of 0 and 1. The scores from the women's empowerment index were further categorized into low (0.0–0.5), medium (0.6–0.7), and high (0.8–1).

Fractional probit model. The influence of sunflower commercialization on women's empowerment was determined using a fractional probit model because the WEI is based on a dependent and is an index that lies between the values 0 and 1. The probit model expresses the expected mean changes in the WEI (y), conditioned on changes to the explanatory variables (x_i), which include the HCCI (Papke & Wooldridge, 2008). Mathematically, this can be represented as $E(y|x_i)$. Whereby y is the average WEI to be estimated, while the covariates (x_i) include HCCI and other household characteristics such the sex and age of the household head, education level of the household head, household size, total agricultural land accessed by the household, non-farm income, and number of crops produced by the household and whether the household owns cattle or not.

Findings and discussion

Acreage under sunflower production in Singida region

The majority (71%) of small-scale farmers (SSFs) and medium-scale farmers (MSFs) in Singida Region cultivate sunflower as a key cash crop. The level of participation by female-headed households (FHH) in sunflower production is lower than male-headed households (MHH) which is highly associated with low access to land rights and ownership of other means of production. As indicated in Table 1, the average land under sunflower production varies among SSFs (0.9 ha) and MSFs (2.5 ha). Likewise, MHHs had a larger mean area (1.3 ha) under sunflower production than FHHs (0.7 ha). As a result, MHHs dominate in sunflower commercialization because they had more sunflower seed harvested than MHHs, and the difference is statistically significant, implying that MHHs and MSFs had a higher mean area than FHHs and SSFs (Table 1). The findings highlight a common trend in other settings in Tanzania (URT, 2012), as well as elsewhere in developing countries.

Table 2. Percentages of households owning different productive assets by farmer category ($n = 600$).

Item	Farm size category		Gender of household head	
	SSF	MSF	FHH	MHH
Tractors	0.2	1.0	0.0	0.4
Plows	51.6	84.8***	41.3	59.7***
Carts	14.1	50.5***	22.6	6.3***
Water pumps	1.2	2.9	0.0	1.7
Sprayers	5.5	24.8***	5.0	9.5

Note: SSF: small-scale farmer; MSF: medium-scale farmer; MHH: male-headed household; FHH: female-headed household. *** = $p < 0.01$ (significant at 1 per cent); ** = $p < 0.05$ (significant at 5 per cent); * = $p < 0.1$ (significant at 10 per cent).

Ownership of productive assets

Table 2 shows the distribution of ownership of productive resources among farmer categories. The common assets owned by almost all households interviewed included low value assets such as hand hoes and axes, and sprayers, but high value assets such as tractors, plows, animal carts, and water pumps were owned by very few household members (Table 2). In terms of land assets, SSFs and FHHs owned less assets that had the highest value (tractors, plows, and water pumps).

The findings show that gender gaps in assets ownership remain a challenge, and are highly associated with negative cultural norms, which undermine ongoing initiatives toward economic development and women's empowerment. This finding is similar to those from other similar studies in Tanzania (Pedersen, 2015; Mosha et al., 2021), Uganda (Alkire et al., 2015), and Burkina Faso (Varley, 2018), which show that women, especially those in MHHs, are more likely than men to lack control over land. This means that despite efforts made by development partners on promoting gender equality, women still face constraints with access to and control over productive assets. So, the challenge in Singida is finding how to legitimize and strengthen the base of women's land rights, which would result in higher yields, and the subsequent income would therefore improve their engagement in sunflower production.

Trends of sunflower productivity in Singida region

Sunflower yields and land under production increased from 2002/2003 to 2007/2008 but then declined after that as indicated in Figure 1. This trend is consistent with narratives presented by FGD participants and key informants, confirming that sunflower production increased significantly during the 2007/2008 cropping season following the efforts made by the government and NGOs in the promotion of the crop to address poverty in the Region.

Despite expanding sunflower production in Singida Region, the productivity of sunflower seeds is very low, with a mean yield of 631.2 kg/ha compared to a potential yield of up to 2800 kg/ha. In terms of yield disparity, SSFs had a higher yield per hectare compared to MSFs (Table 3), although the difference was insignificant. There was, however, a significant difference in the mean yield between MHHs and FHHs at

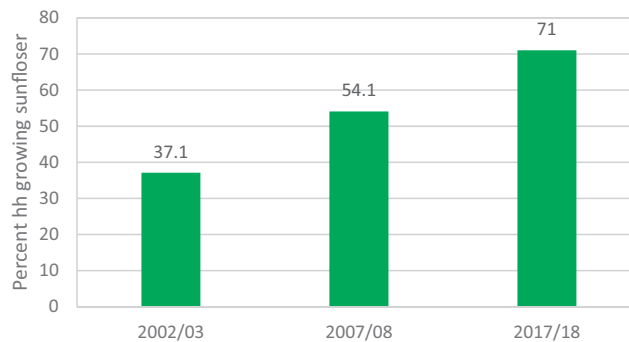
Table 3. Sunflower output and productivity during the 2017/18 farming season by farmer category ($n = 600$).

Farmer category	Sunflower yield (kg/ha)			Sunflower output (kg/household)		
	Mean	Median	Significance of the mean	Mean	Median	Significance of the mean
Farm size:	$n = 600$			$n = 600$		
SSF	654.4	462.5	$F = 0.5$	426.5	288.0	$F = 76.46^{***}$
MSF	553.4	370.7		1269.2	720.0	
Sex:						
Male	657.6	458.1	$F = 1.26$	653.9	370.0	$F = 8.5^{***}$
Female	475.3	415.1		304.9	192.0	
Whole sample	631.2	444.8		603.4	336.0	

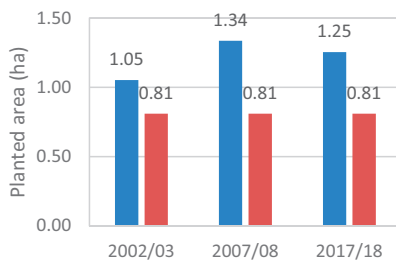
MSF: medium-scale farmer. *** = $p < 0.01$ (significant at 1 per cent); ** = $p < 0.05$ (significant at 5 per cent); * = $p < 0.1$ (significant at 10 per cent).

Source: APRA, Tanzania survey 2018.

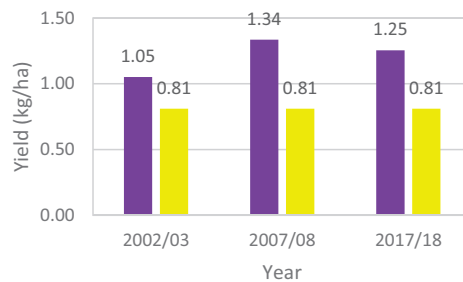
(a) Households growing sunflower



(b) Planted area per household



(c) Mean and Median sunflower yield



■ Mean area planted (ha) ■ Median area planted (ha)

■ Mean area planted (ha) ■ Median area planted (ha)

Figure 1. Declining mean area and sunflower yield. Source: adapted from Isinika & Jeckoniah (2021).

$p > .05$; with FHHs recording lower yields of sunflower seeds compared to MHHs (Table 3).

According to qualitative findings, FHHs had low yields because the use of improved inputs such as seeds and fertilizer was low. Most farmers reported that they could not afford the inputs due to high prices. Consequently, there was a big gender disparity with regard to the use of improved technologies and farm productivity; poor

households, and FHHs could not fully derive the benefits of sunflower commercialization. Similar trends of differences in productivity across gender have also been reported by other scholars (Njuki et al., 2006; Peterman et al., 2011). This is likely to affect levels of women's empowerment, as low levels of access to and control over productive resources result in low agricultural productivity, which affects empowerment levels. Other African studies have also revealed that when a subsistence crop gains economic value, men tend to dominate a crop and its marketing, keeping the income for themselves (Njuki et al., 2011; Zakaria, 2016).

Women's engagement in sunflower commercialization

Qualitative findings show that both men and women were involved in different sunflower production activities including land cultivation, planting, weeding, harvesting, and threshing. In addition to these productive roles, women performed most reproductive activities (household chores, child bearing, and caring for the sick) at household and community levels, implying that women are overburdened in sunflower farming systems. The majority of women were found to have limited time for leisure, and hence participated less in collective actions (17.8%) and social gatherings, for example, in village savings and loan groups, and women's income generating activities that aim to improve women's economic status, and networking.

Historically, processing of sunflower seeds was a women's activity. As reported during the FGDs in Ng'ang'uli, Luono and Isene villages women processed the sunflower seeds by pounding using a mortar and pestle, then followed by boiling the compound to extract oil for domestic use and for sale to local markets, and during that time production of sunflower was low. Nonetheless with increasing commercialization, the Government of Tanzania began to import oil processing mills with high capacity and produce good quality oil. The mill encouraged farmers in the study areas to increase sunflower seed production and commercialization. The commercialization process attracted more men in the sector. "... we (women) are responsible for both productive and reproductive roles, leaving most postharvest handling and marketing of sunflower seed to men," narrated one FGD participant from Isene village. "Our husbands help us in marketing of sunflower seed, because the markets are usually far away from the villages, [and marketing] involves transporting and bargaining with middlemen and traders of which few women can managed it" testified another woman in a married couple.

As sunflower commercialization increased from 1990 onwards, processing and selling of sunflower seeds gradually shifted from women to men, and subsequently gave men more decision-making power over the income. The tendency of men to take over sunflower post-harvest handling sounds logical since it reduces women's burden over processing and transportation on one hand, but on the other hand this has a negative impact on equality in access to and control over income, and consequently leads to low levels of women's empowerment. "Our men in the society usually feel empowered when they manage to participate in business bargaining processes in marketing of produce and handling of household income." ...narrated a village executive officer in Nduguti village. There is a need for the village government to plan and conduct training campaigns in the village on women rights.

Table 4. The influence of HCCI and SCI on women's empowerment: fractional probit model results.

Variables	Model (1): HCCI vs WEI CEI	Model (2): SCI vs WEI CEI
HCCI	0.001* (0.001)	
SCI		-0.001(0.001)
Male head	-0.378*** (0.066)	-0.307*** (0.080)
Age of head	-0.008*** (0.002)	-0.008*** (0.002)
Household size	-0.036*** (0.008)	-0.042*** (0.010)
MSF	-0.121** (0.056)	-0.127** (0.061)
Youth farmer	-0.156** (0.064)	-0.162** (0.078)
Non-farm income	0.008*** (0.003)	0.009** (0.004)
Own livestock	0.027 (0.048)	0.026 (0.060)
Constant	0.953*** (0.161)	1.092*** (0.197)
Observations(n)	497	358

Robust standard errors are in parentheses. HCCI: Household Crop Commercialization Index; SCI: Sunflower Commercialization Index; CEI: Crop Empowerment Index; WEI: Women's Empowerment Index; MSF: medium-scale farmer. *** $p < .01$, ** $p < .05$, * $p < .1$.

Source: APRA, Tanzania survey 2018.

Nevertheless, some women benefited from the government investments into oil processing technologies for mills, as they created employment opportunities for youth and women, and stimulated the growth of both farm and non-farm activities. For instance, some women were processing crude oil residue (*ugido*); an extraction of the remaining oil in sunflower cakes for home consumption and for sale. Others were hired for winnowing and sorting sunflower seeds at mills, and some were engaged in selling cooking oil and animal cake (a by-product of sunflower seeds). The income earned provided an opportunity for livelihood diversification. It was also possible for women to engage in a number of petty businesses like food vending, selling crops and vegetables, and brewing local alcohol, among others. The participation of women in these activities has the potential to increase their income and therefore enable them to join savings and credit groups, which also increases their networking and enhances information sharing on awareness of human rights regarding control over and ownership of production assets. *"Networking with traders, processors and other actors in sunflower value chains increases our confidence and self-esteem, which eases movement towards desired gender change,"* narrated one FGD participant from Isene village, Mkalama District.

The contribution of sunflower and household commercialization toward women's empowerment

A fractional probit regression model was used to estimate the influence of sunflower commercialization and household commercialization on women's empowerment. According to the model's output results, HCCI was positive and significantly influenced women's empowerment, while SCI was negative and insignificant in influencing women's empowerment (Table 4). This shows that crop diversification is very important in influencing women's empowerment in Singida Region, rather than specification, i.e., depending on sunflower commercialization only. There is a need, therefore, to promote various crops grown in the region rather than focusing on sunflower only.

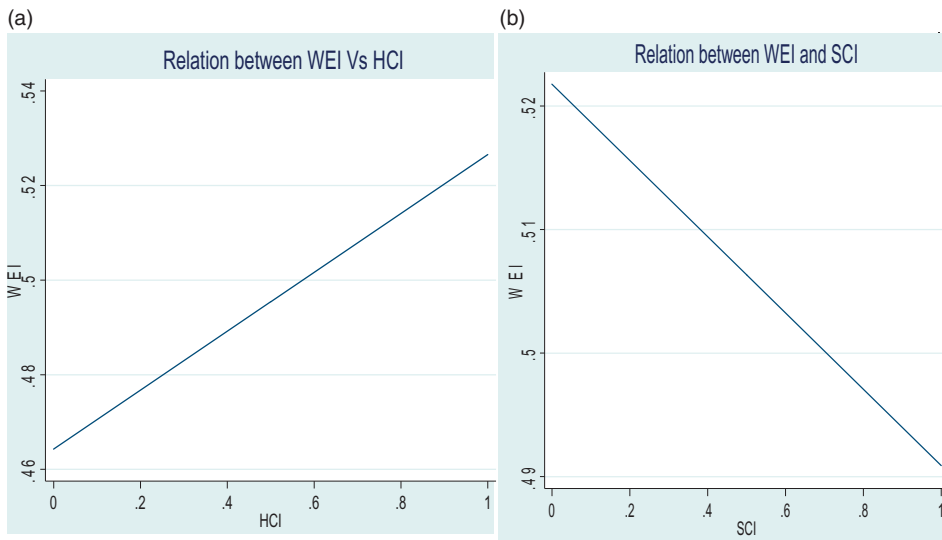


Figure 2. (a) Relation between WEI and HCI. (b) Relation between WEI and SCI.

In addition to multivariate analysis, graphical analysis was done to verify the mode and present the data into a simple graphical format. The results of this analysis also show that there is a negative association between SCI and women's empowerment, while there is positive association between HCCI and women's empowerment in Singida Region (Figure 2(a,b)).

The qualitative findings revealed that women had less access to and control over land and income at the household level, while men dominated post-harvesting and marketing of sunflower, leading to low incomes for women. We also examined the factors that were contributing to low level of empowerment. Participation in non-farm activities, and large household sizes, had a negative association with women's empowerment. This implies that as the family size increased the chances of women being less empowered grew. The main reason for this is that women have additional reproductive and community work, which reduces their chances of participating in non-farm and group collective activities. *"Less women involvement in non-farm activities and financial institutions affects our levels of economic empowerment,"* narrated a respondent from Isene village. Women who are economically empowered are likely to be better off in terms of meeting household basic needs compared with less empowered women.

This result compares with findings from Jeckoniah et al. (2020) that reported that the lower the level of women's empowerment economically and socially, the poorer she is.

Conclusion and recommendations

Women's empowerment is widely perceived to be a key factor in closing gender disparity gaps in social and economic development, ensuring that women and poor households are less marginalized. The overall objective of the study was to explore

the relationship between sunflower commercialization and women's empowerment in the context of Singida Region, Tanzania. The findings demonstrate that sunflower production and commercialization have a gender dimension. For example, women had many more responsibilities compared to men, both productive and production roles. Female household heads had lower yields than male household heads, attributed to small land sizes, and less access to other production resources. Consequently, fewer female household heads engaged in sunflower commercialization, leading to a limited impact on empowerment levels.

Sunflower commercialization is an important endeavor because it creates employment opportunities as well as small- and medium-scale business enterprises, which contribute to agrarian change and diversification of livelihood options in their respective villages. Income from sunflower stimulated investments in on-farm activities (growing crops with high value). Women's participation, and networking with actors, in the sunflower value chain also contributes to women's empowerment. Based on these conclusions, the following policy recommendations are made:

- Income from sunflower stimulated investments in on-farm activities (growing crops with high value such as onions and vegetables), as well as it facilitated investments in off-farm activities. This means that achieving women's empowerment in the context of sunflower commercialization requires a combination of numerous crops in a farming system that will increase agricultural outputs and hence the provision of diversifying income options.
- Making progress on women's empowerment fundamentally requires a focused fight against gender inequality on land (a critical production resource), and for increased bargaining power in decision-making and control over income. Supportive policies and laws, or enforcement of existing policies, are needed to achieve equality in property rights, participation in commercialization of all crops, and bargaining power at household and community levels.
- Improvement in savings and credit schemes is an essential and important pathway to improving women's income sources, networking, and opportunities for creating self-confidence and awareness of human rights.

Notes

1. The detailed methodology is presented in another APRA Working Paper from Tanzania titled: Does Rice Commercialisation Impact on Livelihood: Experience from Mngeta in Kilombero District, Tanzania (Isinika & Jeckoniah, 2021). Methodology is presented in another APRA Working Paper from Tanzania titled: Does Rice Commercialisation Impact on Livelihood.

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Gideon Boniface is an independent researcher, programmer, and data analyst. Currently, he is working with the Agricultural Policy Research in Africa (APRA) Consortium, which is a five-year research program implemented in eight sub-Saharan African countries (Ethiopia, Ghana, Kenya, Malawi, Mozambique, Nigeria, Tanzania, and Zimbabwe). He holds a Master's Degree in Agricultural Economics and a Bachelor of Science Degree in Horticulture from SUA. His areas of expertise and research interests include production and marketing of agricultural crops and computer programming and analysis.

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