
Contribution of Co-operatives Towards Improving Food Security in Rural Tanzania: Implications of Horizontal Integration Practices

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Abstract

Smallholder farmers often establish associations including co-operatives to address production and financial challenges and household level needs. However, due to drastic climate changes, agricultural co-operatives fail to address members' production and food security needs among others. The study aimed to determine the food security status among co-operative members and determine whether horizontal integration of co-operatives has potential to improve food security. A cross-sectional design guided the study. Simple random sampling was used to select 384 respondents from the co-operative societies while purposive technique was used to select the non-members for comparison. Household survey, key informant interview and focus group discussion were used to collect data. Household Dietary Diversity Score (HDDS) was used to determine household food security status while descriptive statistics and independent samples t-test were used to analyze data. Findings show significant differences in household food security status among respondents: multiple members had high food security (41.5%), single members (34.5%) while the non-members (38.7%). Thus, there was a significant difference in food security status among households which is attributed to the horizontal integration practices among co-operatives. As a result of integration, multiple members had more access to resources important towards meeting daily food requirements unlike their counterparts. In conclusion, horizontal integration practices have a significant influence in improving food security among households of co-operative members. Consequently, non-members should consider joining co-operatives to enhance their food security. Further, single members should consider the potential of becoming multiple members to improve and sustain their household food security status.

Keywords: *Co-operative, members, food security, household*

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INTRODUCTION

Agriculture is the main source of employment, income and livelihoods in most rural areas where most of the poor and hungry people live. Through agriculture rural

households consume what they grow, trade goods for other necessities, and sell their crops or livestock for income (Rapsomanikis, 2015; NEPAD, 2013). The majority of households are smallholder farmers who

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depend on agriculture as their main income stream to their household and supports nearly all household activities. Nonetheless, their endeavors are mostly challenged since they depend on rain-fed agriculture which is not sustainable and have to wait for the rain season to carry out their farming activities. This situation sometimes results in increase of food shortages which traps households in a cycle of food insecurity (Dyalvane, 2015) since the majority of rural households are characterised by inadequate safety nets, limited purchasing power and weak food emergency management systems (Manyama *et al.*, 2019).

Food insecurity is a global challenge which threatens mainly smallholder farmers in developing countries particularly in Sub-Saharan Africa (Nkomoki *et al.*, 2019) where majority of households rely on rain-fed agriculture as their main source of livelihood (*income, food, sustenance* etc.) (Mutea *et al.*, 2019). As a hedging strategy to sustain their household welfare and livelihoods, smallholder farmers have formed associations to address their collective affairs whether social or economic (Fischer and Qaim, 2014). In Tanzania, most groups have established co-operative societies in the form of Agricultural Marketing Co-operatives (AMCOs) or Saving and Credit Co-operatives (SACCOs). In doing so, members have adopted different contemporary co-operative model(s) such as the horizontal integration of production oriented and financial oriented co-operatives to achieve economies of scale and enjoy maximum benefits.

The integrated co-operatives play an important role towards empowering smallholder farmers (members) economically and socially by creating a sustainable rural employment through business models that are resilient to economic and environmental shocks (FAO, IFAD and WFP, 2012). Principally, the co-operatives enable smallholder farmers to increase productivity and income by collectively negotiating better prices for

needs like fertilizer, seeds, transport and storage (Dyalvane, 2015). This in return, contributes to food production and distribution as well as supporting long-term food security. Primarily, food security exists when households have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active healthy life (Mohammed *et al.*, 2016; FAO 2006). It is a complex phenomenon involving the dimensions of availability, accessibility, and utilization (Ahmed *et al.*, 2017) in which their assessment is central for overcoming widespread food insecurity and improving rural livelihoods.

Despite the fact that Tanzania is not drought prone, food insecurity has become transitory in nature arising due to instability of food production, food prices, or insufficient household's income commonly experienced in marginal areas of the central and northern regions (Ole Saruni and Mutayoba, 2018). Notwithstanding the presence of co-operatives throughout the country providing either production, marketing and/or financial services, the threats of food insecurity are still persistent among the members' households. Members (smallholder farmers) have a tendency of selling their produce to private traders at lower prices or sometimes overselling their produce due to competing needs for cash for attending health and education needs. Thus, they relinquish the opportunity to bring their produce to co-operatives and hedge their chances against food insecurity through proper postharvest management and improved household incomes through collective bargaining.

Also, the increased intensity of environmental extreme events (i.e. floods, droughts, extreme variability in temperature and rainfall) have increased the pressure on the conventional food production systems used by smallholder farmers and threatened the current food security (FAO, 2014). Similarly, higher food prices negatively affect food access and availability (food

security) for low income and already poor rural households who mainly resort to co-operatives as their cushion. As a result, agriculture-based co-operatives have been caught amidst the drastic climate challenges and fail to address members' production and food security needs, among others. Though presence of co-operatives is not a panacea to food insecurity, being the poor people's associations mostly in rural areas, co-operatives are expected to address production, marketing, financial and household needs including food security among households. Therefore, the study aimed to determine the rural household food security status; and determine implications of the integrated co-operative model (horizontal integration) practices towards improving household food security.

METHODOLOGY

A cross sectional research design was adopted to guide the study whereby data on variables of interest (horizontal integration and food security) were collected and examined to determine variables' association and pattern of relationship as observed by Bryman (2012). The design was preferred because it allows data to be collected rigorously within a specified time in order to draw inferences. Thus, it was possible to establish the contribution of horizontal integration practices on food security among participant and non-participant households. Based on the design underlying assumptions, a counterfactual approach was used to establish the contribution basing on patterns of variables, level of significance (p -values) and magnitude (t -test and eta square statistics) of differences between the control (non-participant) and treated (participant) groups. The study was conducted in two districts namely Mbinga (located in Southern Tanzania) and Moshi (located in Northern Tanzania). The Districts were selected due to presence of co-operative societies having horizontal integration features in the coffee sub-sector. In Moshi, Mruwia AMCOs and Mruwia SACCOs were selected while

KIMULI AMCOs and Muungano SACCOs were selected to represent Mbinga District.

The target population was the members of horizontally integrated co-operative societies namely Mruwia, KIMULI and Muungano. KIMULI AMCOs had a total of 1786 members, Muungano SACCOs had 1021 members, Mruwia AMCOs had 417 members while Mruwia SACCOs had 1405 members at the time of data collection. The sample size of both participants and non-participants in horizontal integration was estimated at 384 respondents using Fisher *et al* (1991) sampling formula. The formula was chosen because it provided room for selecting respondents with particular characteristics (p) and without particular characteristics ($1-p$) which was critical in this study. However, only 228 respondents (single members 113, multiple members 53, and non-members 62) were approached successfully. Simple random technique (using lottery approach) was used to select the members of co-operatives in the horizontal integration. Members were randomly selected using members registers that were available at the AMCOs and SACCOs while non-members were purposely selected from the neighborhood within the proximity of the selected co-operative societies.

Data was collected using Household Survey (HHS), Focus Group Discussion (FGDs) and Key Informants Interviews (KIIs). A total of 3 FGDs (2 per district) were conducted involving 24 participants (8 multiple members, 8 single members, and 8 non-members) supported by 6 KIIs with 2 District Co-operative Officers (DCO), 2 Village Executive Officers (VEO) and 2 Board members from each co-operative society. The main issues discussed included services offered under the integration, strength and challenges of integration, implications of integration on food security, sustainability of the integration as well as governance issues in the integration. Qualitative data were analyzed by using constant comparison technique whereby

incidents applicable to key themes (integration and food security) coded (open, axial and selective) and compared as recommended by Leech and Onwuegbuzie (2008) and Onwuegbuzie *et al.* (2012).

Descriptive statistics (mean, median, frequency and percentage) were used for analysis of socio-economic characteristics while Household Dietary Diversity Score (HDDS) as put forward by Swindale and Blinsky (2005) was used as a measure of food security. The measure provides reflections on both of food availability and food access, on the premise that households consume a variety of foods when they have the means to acquire them in a given period. A household with a HDDS of ≤ 3 was categorized as a low food security, with a HDDS of 4 to 5 was categorized as a moderate food security while those with a HDDS of > 5 were categorized as a high food secure household. Thereafter, Independent Samples T-test and ANOVA were conducted to compare the mean differences of HDDS between groups to determine whether there are significant differences.

FINDINGS AND DISCUSSION

An Overview of Horizontal Integration Practices Among Co-operative Societies

Horizontal integration practices in the context of the study areas involved amalgamation of AMCOs and SACCOs operations relating to agricultural financial, production and marketing. Whereas much co-operative development focuses on supporting a single co-operative or group of co-operatives at a time, this integrated model supported the inclusion of two distinct but interconnected co-operatives. Since each co-operative had its own members, the integration did not affect membership status (voluntary membership) though there came the concept of multiple membership and single membership. Multiple members were smallholder farmers who were members of both the AMCOs and SACCOs operating under horizontal integration arrangements.

The single members were smallholder farmers who were members of either

AMCOs or SACCOs operating under horizontal integration arrangements but not interested in becoming a member of both co-operatives. Through interviews the DCOs in Mbinga and Moshi pointed out that the horizontal integration practices between KIMULI AMCOs and Muungano SACCOs as well as Mruwia AMCOs and SACCOs respectively were done by considering the 6th Principle of Co-operatives which is *Cooperation Among Co-operatives*. The principle calls for cooperatives to strengthen each other by working together through local, national, regional and international networks. In focus group discussions, members highlighted that the co-operatives in the study areas basically were horizontally integrated for purposes of improving value chain activities financing, enhancing processing of produce and improve marketability.

During focus group discussions members (smallholder farmers) concurred that the integration brought significant impact to their household livelihoods. Being multiple members, smallholder farmers could borrow from SACCOs to buy farm inputs from AMCOs and continue with production until the harvest season where the AMCOs will deal with processing and marketing. After selling, payments are channeled through members accounts in SACCOs by AMCOs officials (on behalf of farmers). The compulsory deductions are settled (contributions, levies, loan deductions) then the remaining balance is deposited in the respective members' saving account in the SACCOs for future use. Hence, the highlighted integrated practices enabled smallholder farmers to access inputs on credit, receive extension services, produce and process quality output but also increase their propensity to save through SACCOs in order to sustain future household expenditures (food, shelter, clothing, school, medical etc.).

Food Security Status Among Households in the Districts

The state is household food security was

determined in both districts using the HDDS and their respective interpretation as highlighted by Swindale and Blinsky (2005). The study compared household food security status in the selected villages (as representatives of the districts) and results indicate that households in Mbinga District are much better compared to Moshi District. In Mbinga district, 42.6% of sampled households had higher HDDS followed by 37.6% with moderate and 19.8% with low score (Table 1). The pooled results imply that most households had higher and moderate food security status thus were able to accumulate food stocks that meets their dietary needs for an active healthy life. In Moshi District, results in indicate that majority of sampled household (44.9%) have low status of food security followed by 27.6% with moderate and high food security status respectively. This implies that there were higher chances of food insecurity among the selected households by considering the dimensions of availability,

accessibility and utilization of food as observed by Ahmed *et al.* (2017).

Comparing the two districts, it shows that sampled households in Mbinga are in favorable food security conditions unlike in Moshi where the chances of food insecurity were very high. Unlike households in Mbinga District, in Moshi they are constrained by land size for livestock keeping as well as cultivation of both food and cash crops which are the main source of livelihood. With the limited land size, households have adopted mixed crop production that includes cultivation of coffee, banana, maize, vegetables and beans in some parts but also, they keep livestock. In Moshi, the average land size used for crop production was 1.21 acres unlike Mbinga where households have an average of 6.20 acres. Assuming, that the size of land implies higher output it means there is limited expansion of production basing on land size in Moshi which affects the chances of food security.

Table 1: Pooled Household Dietary Diversity Score by District

District	HDDS	Frequency	Percent
Mbinga	Low	20	19.8
	Moderate	38	37.6
	High	43	42.6
	Total	101	100.0
Moshi	Low	57	44.9
	Moderate	35	27.6
	High	35	27.6
	Total	127	100.0

Implications on Food Security

Co-operatives being socio-economic associations have played a great role towards addressing members well-being either at individual or at household level. To determine the implications of horizontal integration practice among co-operatives, the study profiled and compared the status of household food security between multiple members, single member and non-

members (counterfactual assessment). As highlighted before, the multiple members are the smallholder farmers enjoying the benefits of both AMCOs and SACCOs unlike the single members who only enjoy the benefits of either a SACCOs or AMCOs. Hence, the status of food security was determined using HDDS and results in Table 2 indicate that there were substantial differences in household food security status between multiple members, single

Table 2: Households' Food Security Status

HDDS		Multiple Member (n = 53)		Non-Member (n = 62)		Single Member (n = 113)	
		Freq.	Percent	Freq.	Percent	Freq.	Percent
≤ 3	Low	14	26.4	24	38.7	39	34.5
4 to 5	Moderate	17	32.1	21	33.9	35	31.0
>5	High	22	41.5	17	27.4	39	34.5

members and non-members. Most of the multiple members were in the high food security status (as accounted by 41.5%) followed by the single members (with 34.5%) while most of the non- members were in the low food security status (38.7%).

Mostly, multiple members and even some single members have access to and can meet their daily food requirements conveniently compared to non-members due to increased farm production, diversified sources of income and ability to seek financial assistance from the co-operative. Majority of non-members with low socio-economic status in the community mostly rely on casual labor which leads to limited choices between earning income and allocating adequate time to deal with their farms. This eventually influence accessibility and availability of adequate food at household level of which most are incapable of balancing the conflicting activities. Also, non-member have limited access to support and financial services (savings and credit) which amplifies their struggle at times of livelihood shocks and exposures such as shortage of farm inputs and pesticides, shortage of nutritious food as well as inability to cover medical and school expenses.

During focus group discussions it was found out that members of co-operatives

(particularly the multiple members) had improved livelihoods (food security, household income, household assets etc.) and possessed more land for crop production due to the services (financial and production and marketing) accessed from the co-operatives (AMCOs and SACCOs) which the non-members had no access to. This led members to better resources, hence wealthier and hedge against livelihood shocks including food insecurity unlike their counterparts. The wealth index developed by summing up all the assets of the household including farm implements shows that multiple members had a higher mean index (MI = 15.264) compared to the non-members (MI = 8.956). This has an implication on livelihood sustainability particularly ability to sustain food security status and other household welfare expenditure such as medical and school expenses.

The study further tested whether there was a significant mean difference between the HDDS among the compared groups and determine the implication of horizontal integration practices. Findings indicated that there was a significant mean difference in food security status between multiple members and non-members (as indicated in Table 3) and basing on the assumptions of the counterfactual approach they are attributed to

Table 3: Mean comparison of HDDS between multiple members and non-members

Household Dietary Diversity Scores (Food Security)	Levene's Test for Equality of Variances		T-Test for Equality of Means				
	F	Sig.	T	DF	Sig.	MD	S.E Difference
Equal variances assumed	1.460	0.023	2.013	113	0.047	0.436	0.217
Equal variances not assumed			1.989	103.232	0.049	0.436	0.219

involvement of smallholders in horizontal integrated co-operatives. Based on the approach, a contribution of an initiative is determined when there is a significant difference between a control group (without exposure) and treated group (with exposure). Hence, based on the findings, there is a significant difference ($p = 0.04$) of household food security status between multiple members (treated group that has been exposed to horizontal integration co-operative practices) are non-members (control group that has not been exposed to co-operative practices).

This implies that horizontal integration practices relating to production, finance and marketing have implications towards improving household food security unlike the conventional co-operative practices which at some point don't provide adequate cushion to address collectively the members welfare. The implications of integration were also emphasized by a key informant during an interview who pointed out that "... compared to the non-members, multiple members are better off not only in household food security but also in terms of general household

livelihoods even when compared to the single members...the integration practices have enabled them to acquire more productive land, prepare their farms on time due to their ability to hire labor and have timely access to farm inputs. This has increased their chances of higher productivity which in turn guarantee food security but also increased household income after selling their produce..."

Respondents were also asked to indicate the number of meals they consumed per day in their households in the months when food was scarce and when food was plenty in the community. The results in Table 4 indicate that there was a significant difference of meals consumed per day in times of scarcity, whereby multiple members and single members consumed three meals per day compared to non-members who consumed only two meals per day. This is likely because members of co-operative societies have appropriate livelihood strategies to meet their basic needs (through co-operatives services) compared to non-members who also earn low incomes.

Table 4: Meals consumed per day in months of plenty and scarcity

Number of Meals	Multiple Member n = 53		Non-Member n = 62		Single Member n = 113		F. Test	Sig.
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev		
Consumed per day in months of plenty	3	0.553	2	0.695	3	0.496	1.446	0.023
Consumed per day in months of scarcity	3	0.599	2	0.743	3	0.614	6.583	0.002

CONCLUSION AND RECOMMENDATIONS

Horizontal integration of co-operatives being a contemporary model has substantial implications on smallholder farmers (members) welfare in terms of access to production, marketing and financial services.

Based on findings, the study concludes that horizontal integration practices among co-operatives have a contribution towards improving food security among members

households. The practices provided a substantial cushion for multiple members to address their household welfares reasonably and minimize livelihood vulnerabilities unlike their counterparts who remain exposed most of the time. That being the case, it is recommended to non-members that they should consider becoming members of co-operatives as their "safety nets" against livelihood vulnerabilities such as food insecurity.

Though co-operatives may not be a panacea for all exposures, at least they provide services that serve as hedging strategies in the rural areas where inclusion in the development agenda is still debatable. Despite single members not being affected much by food insecurity, it is recommended that they should consider upscaling their membership to horizontally integrated co-operative in order to achieve economies of scale by being able to access jointly the services offered by AMCOs and SACCOs.

Finally, since the study was cross-sectional, in the future there is a need for more longitudinal studies to be done in order to validate the findings but also capture the sustenance chances of the horizontal integration practices over time among households of smallholder farmers. The study will provide more concretized findings on the implications/contributions of horizontal integration practices among co-operatives on household food security and livelihoods.

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