

# **Contribution of Smallholder Sugarcane Contract Farming to Household Livelihood Outcomes in Kilombero Valley, Tanzania**

**By**

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## **Abstract.**

This study was moved by such information that contract farming (CF) has much potential for improving household livelihood outcomes among sugarcane out growers. However, studies debate on whether sugarcane out growers generate better livelihood outcomes or not from CF relations. Levels of livelihood outcomes (LO) attained by farmers, impacts of CF arrangements on household LO and sustainability chances of the LO have not sufficiently been explored. Thus, this study was conducted to contribute to the knowledge gap. Specifically, the study:

- determined the quality of CF services offered by sugarcane farmers' associations,
- determined levels of LO among smallholder sugarcane farmers,
- analysed the impact of CF arrangements on smallholder farmers' LO levels, and
- determined perceived sugarcane CF constraints and sustainability chances of the LO attained by sugarcane out growers.

This study was conducted in Kilombero and Kilosa Districts located in Morogoro Region, Tanzania. The two districts were selected for the study because they had smallholder farmers with farm sizes which ranged from 0.9 to 3.0 hectares. This range is the one which defines smallholder farmers in Tanzania. The districts also had over 5 000 smallholder sugarcane out growers in 2013. This was a large population of sugarcane out growers in Tanzania. Kilombero and Kilosa Districts constitute the largest sugar producing area in Tanzania. The area lies East of the Udzungwa Mountains and extends to the North and South of the Great Ruaha River in Kilosa District. The research was narrowed to six wards, namely Kidatu, Sanje, Mkula, Ruhembe, Kidodi and Ruaha. Further, the study explained that the valley was the largest sugarcane producer in Tanzania. It had more than 8 000 sugarcane out growers with many smallholders, with about 15 000 ha under cane production. The livelihood for smallholder farmers in the Valley highly depends on sugarcane CF arrangements, and that is why the Government of Tanzania introduced agricultural support/service mechanisms to sugarcane smallholder farmers through SBT, NSI and farmers' associations

The theoretical frameworks that guided this study included;

- Sustainable livelihood approach (SLA)

The study summarised that the concept of sustainable livelihood (SL) was an attempt to go beyond the conventional definitions and approaches to poverty eradication. These had been found to be too narrow because they focused only on certain aspects or manifestations of poverty, such as low income, or did not consider other vital aspects of poverty such as vulnerability and social exclusion. Various organisations have used the SL approach; they include: United Nations Development Programme (UNDP), CARE International, and Department for International Development (DFID). The SLA, as adopted by DFID, offers a way of assessing how organisations, policies, institutions and cultural norms shape livelihoods, both by determining who gains access to which type of asset, and defining what range of livelihood strategies are open and attractive to people for their livelihood outcomes sustainability. The SLA by DFID seeks to identify and reconcile important assets in livelihood, their trends over time and space as well as the nature and impacts of shocks and stresses on livelihood outcomes. Accordingly, the sustainable livelihoods approach improves understanding of the livelihoods of the poor. It organizes the factors that constrain or enhance

livelihood opportunities, and shows how they relate. It can help plan development activities and assess the contribution that existing activities have made to sustaining livelihoods.

In this study, some of the livelihood assets selected and tested were: sugarcane land size, farmers' experiences in contract farming, credits from financial institutions, net income from sugarcane, average income from other crops apart from sugarcane, extension services accessed through farmers' associations, and agricultural related information accessed through farmers' associations. The SLA thinking on the factors that constrain or enhance livelihood opportunities guided the study to see the necessity of examining constraints that can affect farmers' access to contract farming services. Consequently, the study assessed the sustainability chances of livelihood outcomes attained by farmers in the study area. The assessment was thought to give a clear picture on the levels of livelihood outcomes' sustainability. The SLA, though it offers an insight regarding understanding on the five principal categories of livelihood assets, does not clearly provide a systematic framework to analyse contractual relations.

- Principal-agent theory

In examining delivery of contract farming services to farmers, it was logical to position the study in a theoretical framework. Clearly, the principal-agent theory dominates in the literature of contract farming. Agency theory deals with the relationship between two parties, principal and agent. The relationship in this case was between sugarcane out growers and a firm that buys sugarcane. In view of that, contract farming is a principal-agent game whereby a firm (the principal) and a grower (the agent) work jointly to produce a crop. The firm chooses growers with whom it would like to contract under and the terms set. In an agency relationship, the agent (e.g. the farmer/farmers' association leaders) is expected to behave in accordance with the goals of the principals (e.g. lenders, processors). It helps us to enhance our understanding of how and why different contractual arrangements evolve. In applying the theory, therefore, this study assessed the services delivered by both the principal (sugarcane buyer) and the agent (farmers' associations) to see if the relationship was skewed to an advantage(s) of the buyer, farmers or both parties.

- Service quality model (SERVQUAL model)

SERVQUAL model represents service quality as the discrepancy between a customer's expectations of service offered and the customer's perceptions of the service received. What this model strives to measure exactly is the consumer perception of the service quality which depends on the size of the gap between expected service and perceived service which in turn, depends on the gaps under the control of the service provider such as delivery of service and marketing. This measurement of service quality is based on both how consumers evaluate the service delivery process and the outcome of the service. A good service quality is considered as one which meets or exceeds consumer's expectation of the service. The service quality model was a composite of five dimensions which are reliability, responsiveness, assurance, empathy, and tangibles to determine service quality. Four of the five dimensions, responsiveness, reliability, assurance, and empathy mainly focus on the human aspects of service delivery, and the fifth one mainly focuses on the tangibles of service. Since the SERVQUAL model deals with expectations and perceptions of individuals about services offered, in this view the model was used to measure the quality of contract farming services offered to sugarcane smallholder contract farmers in Kilombero valley.

- Data, qualitative and quantitative, were collected in Kilombero and Kilosa Districts in February and March 2014 through a survey that covered a random sample of 300

households. Key informant interview and focus group discussion were also used to collect data. Qualitative data were transcribed into the text and analysed based on content and meaning of the text. IBM Statistical Package for Social Sciences Statistics and Microsoft Excel computer programmes were used to analyse quantitative data. Quantitative data were analysed inferentially through such techniques i.e Multiple linear regression.

The results of this study on sugarcane out growers' views on contract farming services quality which was measured using a SERVQUAL model revealed that;

- ✓ The overall weighted SERVQUAL score was -13.32 (unacceptable quality). The values for the weighted SERVQUAL score showed how much each dimension was deficient in contributing to the satisfaction of farmers. This means that sugarcane smallholder farmers who received services from sugarcane farmers' associations were highly dissatisfied with the services received.
- ✓ The dissatisfaction was high on price negotiation capacity (49.3% of the respondents), followed by extension services (38.7% of the respondents), and transport arrangements was the third item with 32.7% of the respondents (Table 4)

**Table4: Status of farmers' satisfaction on the CF services offered/coordinated by farmers' organization**

Type of Service	Levels of Satisfaction		
	Satisfied very much (%)	Satisfied a little (%)	Not Satisfied at all (%)
Price negotiation	1.0	49.7	49.3
Credit facilitation	0.7	72.3	27.0
Farm inputs facilitation	0.7	73.3	26.0
Extension service	1.0	60.3	38.7
Harvesting arrangements (harvesting plan and implementation)	2.0	65.3	32.7
Sugarcane transportation arrangements (engagement of contractors and follow up)	1.3	67.7	31.0
Payments follow up	2.0	69.7	28.3
Average percentage	1.2	65.5	33.3

- ✓ Among the services provided by the sugarcane buyer, with which the farmers were not satisfied at all, quality control was ranked high (80.3% of the respondents), followed by price setting (78% of the respondents), and the third was weighing at the Mills' gate (76.3% of the respondents) as in Table 5

**Table 5: Status of farmers' satisfaction on the CF services offered/coordinated by the sugarcane buyer in Kilombero Valley**

Type of Service	Levels of Satisfaction		
	Satisfied very much (%)	Satisfied a little (%)	Not Satisfied at all (%)
Price setting	0	22.0	78.0
Quality control	0	19.7	80.3
Weighing at the Mills gates	0.7	23.0	76.3
Effecting payment timely	0	42.3	57.7
Communication in case of payment delay	0	83.0	17.0
Social services (e.g. health care, education)	0	55.3	44.7
Agricultural training to farmers	0	32.0	68.0
Management of farmers' sales record	0	35.7	64.3
Leadership accountability	0	48.7	51.3

Regarding the Levels of livelihood outcomes available among smallholder farmers, it was found that;

- ✓ The mean score on the livelihood outcomes index was 1.986, which was at a low level. These results implied that, generally, smallholder farmers in Kilombero valley were categorized in the low livelihood outcomes.
- ✓ Using Pearson's correlation, the findings on correlation between livelihood outcomes attained by smallholder farmers and their household characteristics demonstrated that land size cultivated for sugarcane, household head years in CF and age of the household head had significant correlation with the dependent variable, implying that the variables had high relationships with livelihood outcomes.

On impact of sugarcane CF arrangements on smallholders' livelihood outcomes, it was found that;

- ✓ The results established that the main CF arrangement experienced by farmers was farm inputs facilitation through farmers' associations (16%), followed by credit facilitation by farmers' associations (15.8%). However, price negotiation representation by farmers' leaders was noted to be the lowest (10.8%). The results imply that farmers had doubts on their leaders' bargaining powers on the sugarcane price.
- ✓ The results showed that the mean experience of years in contract farming was 7.3 years, with a minimum of two (2) years and a maximum of 30 years. The majority (57.0%) of the household heads had one (1) to five (5) years' experience in growing sugarcane under contract farming.
- ✓ The group with six (6) to 10 years' experience accounted for 24.3%. The proportion of household heads with 11 to 30 years' experience was relatively small, and they accounted for 18.7%. Farmers' duration in contract farming is thought to be an important determinant of levels of livelihood outcomes.
- ✓ With time, farmers were expected to make investment in sugarcane business, and they can probably build capital, knowledge and skills to move out of poverty. Kilombero valley was observed to have few long-time cane out growers similar to Kakamega

County in Kenya where the majority of farmers were between 31 and 60 years and had not been in cane farming for more than five years

- ✓ The mean net income was TZS 3 052 782, with a minimum of TZS 0 and a maximum of TZS 28 000 000. The results further indicated that 47.0% of the farmers in the study area had net monetary value of TZS 2 231 000 and above from sugarcane sold by farmers in 2013 harvesting season. The group of farmers who had net monetary value of TZS 831 000 to 2 300 000 from sugarcane accounted for 37.6% while the proportion of households with TZS 0 to 830 000 was relatively small, and they accounted for 15.4%.
- ✓ The findings imply that farmers managed to gain income from sugarcane. Income from sugarcane was also found to be the most important livelihood option in Kilombero valley by many previous researchers
- ✓ Farmers' income from other crop(s), net income from sugarcane sold in the 2013 harvesting season, access to extension services, access to farm inputs and estimated income from non-farm sources in 2013 with had positive Beta-weights ( $\beta$ ) statistics of 0.169, 0.267, 0.150, 0.175 and 0.082 respectively; the null hypothesis that sugarcane contract farming arrangements do not have significant impact on farmers' livelihood outcomes was rejected. The fact was that many of the sugarcane contract farming arrangements variables contribute substantially to improving farmers' livelihood outcomes.

On perceived sugarcane CF constraints and sustainability chances of the livelihood outcomes attained by sugarcane out growers, the study showed that;

- ✓ The main constraint experienced by farmers was low sugarcane price compared to production costs incurred by farmers in the study area (14%).
- ✓ The capacity of sugarcane mills to process sugarcane was low compared to farmers' produce (13.2%). In general, the results imply that farmers were strongly constrained in terms of where to sell their produce, but at the same time sucrose content measurement was controlled only by sugarcane mill owner.
- ✓ On the sustainability chances of livelihood outcomes attained by sugarcane out growers, the study demonstrated that the mean score on the livelihood outcomes' sustainability index was 1.936, which was at a low level. These results imply that smallholder farmers in Kilombero Valley were categorized in the low chances of livelihood outcomes' sustainability.

The results on theoretical aspects, the study reported that;

- The agency theory claims that in an agency relationship the agent is expected to behave in accordance with the goals of the principals. It was indicated that the relationship between agency relationship was skewed to the advantage of the sugarcane buyer only (90%); 5% agreed that the relationship favoured both parties, and five percent indicated that the relationship favoured the advantage of farmers only.
- On the other hand, the results indicated that leaders from farmers' associations failed to negotiate strongly on sugarcane prices with the sugarcane buyer (49.3%), implying that farmers' representation had less power to bargain for their sugarcane related matters. Therefore, with the stated results, the theoretical claim that in an agency relationship, the agent is expected to behave in accordance with the goals of the principal was observed to be practically true.
- The null hypothesis that there is no correlation between livelihood outcomes attained by farmers and their household characteristics; was rejected. The fact was that many of the independent variables used correlated positively to the livelihood outcomes attained

by farmers in the study area. Therefore, it was explained that household characteristics are crucial for farmers to attain their livelihood outcomes.

- The contractual supports (livelihood assets) are very important for smallholder farmers to attain high livelihood outcomes.

Recommendations of the study on key issues revealed as the results of analytical undertakings;

- Addressing contract farming services quality

To address contract farming services quality deficiencies, it was recommended that empathy should be tackled first by the farmers' associations, and the other dimensions should follow suit. In tackling the dimensions, farmers' associations should employ extension officers (to guide association growers), agri-business experts (to manage associations' business) and legal officers (responsible for associations' legal/contract matters). This will enhance associations' services quality. Training to associations' staff and leaders on customer care, and leadership skills should regularly be provided by the farmers' association in collaboration with the National Sugar Institute (NSI).

Secondly, it was recommended that both farmers' associations and the buyer should be active initiators of cane supply agreement (even sub-contracting law firms to initiate). In collaboration with NSI, farmers' associations should educate and ensure farmers' access to cane supply agreement. This will create a smooth business environment between farmers and the buyer. The government of Tanzania, through the SBT, should ensure the presence of essential services to support sugarcane farmers and buyers (e.g., restrict illegal importation of foreign sugar). The SBT should guide associations' formation, structure and legislation. Smallholder farmers should be facilitated by the SBT to build up their associations suitable to their business needs.

- Addressing the levels of livelihood outcomes available among smallholder farmers

To address the low level of livelihood outcomes prevailing among smallholder farmers, it was recommended that available sugarcane farmers' associations in the study area, in collaboration with the Sugar Board of Tanzania (SBT), should set plans for raising farmers' livelihood outcomes. It is further recommended that farmers' associations and the Sugar Board of Tanzania should pay more attention to the household characteristics that have negative correlation well with farmers' livelihood outcomes.

- Addressing impacts of sugarcane CF arrangements on smallholder livelihood outcomes

It was recommended that contractual support provided by sugarcane farmers' associations should increase farmer' access to farm inputs, credit and their ability to negotiate for better prices of their sugarcane outputs for improved outputs, income and hence better livelihood outcomes. In addition, the government of Tanzania, through the Sugar Board of Tanzania and farmers' associations, should ensure that farmers get good sugarcane price as well as adequate farm inputs at affordable prices. Follow up on farmers' payments in case of delay should be done regularly by the farmers' association officials. It is further recommended that farmers' associations, local government authorities, and other stakeholders should collectively make efforts to encourage farmers to participate in sugarcane contract farming; it will assist them to get friendly production environment for sugarcane.

- Addressing sugarcane CF constraints and sustainability chances of the Livelihood outcomes attained by sugarcane out growers

It was recommended that the Sugar Board of Tanzania, in collaboration with the National Sugar Institute, should undertake a collaborative survey to come up with a sugarcane smallholder farmers' organizational and inclusive aggregation model that gives high chances of sustainability to livelihood outcomes attained by farmers in the study area. Accordingly, it was recommended that the SBT and farmers' associations should make sure CF constraints that

affect farmers' access to contractual services addressed. They should also make sure that smallholder farmers generate more income from their sugarcane generating activities so that they can improve their savings. This may increase chances of farmers to sustain their livelihood outcomes attained through sugarcane contract farming.

- ✓ Contribution of the study; contract farming (CF) has much potential for improving household livelihood outcomes among sugarcane out growers. However, studies debate on whether sugarcane out growers generate better livelihood outcomes or not from CF relations. Levels of livelihood outcomes (LO) attained by farmers, impact of CF arrangements on household LO and sustainability chances of the LO have not sufficiently been explored. This study contributes to this knowledge gap. The study findings provided an affirmation that sugarcane contract farming arrangements can contribute substantially to farmers' livelihood outcomes. The findings also provided new insights to the literature on levels of livelihood outcomes attained by smallholder farmers and sustainability chances of the livelihood outcomes. This was done by creation of a livelihood outcomes index (LOI) and a livelihood outcomes sustainability index (LOSI).
- ✓ In terms of methodological approach, the study provided an alternative way of determining the levels of livelihood outcomes as well as how to determine the livelihood outcomes sustainability by constructing these two indices. Accordingly, the study constructed 16 tailored statements in the context of sugarcane contract farming which measured quality of CF services offered by the sugarcane farmers' associations. The statements originated from the SERVQUAL model's five dimensions (reliability, responsiveness, tangibles, assurance and empathy)

In terms of theoretical contribution, the study proved that the sustainable livelihood approach enlightens well important livelihood assets in the context of sugarcane CF that can have high impact on farmers' livelihood outcomes. Through the study, it was also well-known that the principal agent-theory explains well the contractual relationships between smallholder farmers and the firm that buys farmers' sugarcane. Therefore, broadly, the results from this study contribute new knowledge on smallholder sugarcane contract farming and its contribution to farmers' household livelihood outcomes. This information is critical in influencing political, economic and social actions at local and national levels to manage sugarcane contract farming services and risks associated with production and marketing of sugar.

Generally, the study provided the following recommendations;

- ✓ Empathy was the most deficient dimension in the study area. The empathy dimension as per the SERVQUAL model measured farmers' organization workers' customer care to farmers and their capacity to understand smallholder farmers' needs.
- ✓ there were many deficiencies in price negotiation, extension services, transport arrangements, price setting, quality control as well as weighing sugarcane consignments at the Mills' gate.
- ✓ The relationship between farmers' association and the sugarcane buyer was perceived by farmers to be bad and to the advantages of the buyer only.
- ✓ Smallholder farmers under out growers' scheme in the study area had lower livelihood outcomes even though they had chances of getting contract farming services through their farmers' associations and the sugarcane buyer.
- ✓ The sugarcane contract farming arrangements have vital contribution to sugarcane smallholder farmers' livelihood outcomes.
- ✓ smallholder farmers face complications while accessing contractual support.

- ✓ The chances of sugarcane smallholder farmers to sustain their livelihood outcomes in case contractual support ends was limited, signalling that sugarcane smallholder farmers still need contractual support.