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Opportunities for and Constraints to Women's Empowerment in Tanzania's Cashew Value Chain

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ABSTRACT

Cashew is a cash crop primarily grown by smallholder farmers in Tanzania and is a major source of rural employment and income in Coastal areas. Women dominate small-scale cashew processing yet face various constraints to increasing their productivity and profitability. This study assesses the effectiveness of an intervention that provided equipment and training to women's cashew processing groups (WCPGs) in Mtwara and Lindi regions, implemented by the Small Industries Development Organization (SIDO). The study uses mixed methods including in-depth focus group discussions with WCPGs, male and female cashew farmers, and other stakeholders in the cashew value chain, data on WCPG processing productivity, costs, revenues, and profitability with and without the improved processing equipment. The findings indicate that groups using this equipment can process 3 times as much RCN per day compared with the quantity that they could process before using rudimentary shelling tools. This results in participating WCPGs producing about 85 percent more processed cashew per season on average compared with a control group of WCPGs, and 3 times higher profits per season. However, participating WCPGs still face constraints including credit for accessing raw cashew and reliable access to markets for their processed cashew. The results suggest that this and similar interventions need to take a more holistic approach, recognizing that a technology intervention intended to increase production should be complemented by efforts to alleviate input and output marketing constraints.

Keywords: Economics of gender, crop productivity, market participation, agricultural technology, smallholder farmers

JEL Classifications: J16, Q00, Q10, Q13, Q12

EXECUTIVE SUMMARY

The Government of Tanzania (GoT) has identified the cashew nut value chain as having great potential to help semi-subsistence farm households shift into more commercial and profitable agricultural activities as well as to support women's economic empowerment. This has led the GoT and development partners to implement several programs in recent years to increase women's engagement in the cashew value chain. However, very little research exists to inform the choice and design of current and future programs, and no study to date has assessed an intervention by the Small Industries Development Organization (SIDO) of the GoT hat has provided improved small-scale cashew processing equipment and training to selected women's cashew processing groups. This study addresses this knowledge gap through analysis of qualitative and quantitative data gathered by the authors in Tanzania's two main cashew production regions, Mtwara and Lindi. The authors conducted interviews and focus group discussions with key actors along the cashew value chain, including smallholder cashew producers and women's cashew processing groups. The study results highlight that many challenges remain to increasing women's participation in and benefits from engagement in the cashew value chain in Tanzania. The following are the study's key findings.

Nature of gendered roles in the Tanzania cashew value chain

There is a strong gendered pattern of participation in cashew production whereby men are primarily involved in tasks such as pruning, applying fertilizers and pesticides, and transporting cashew from the field, while women are primarily involved in tasks that are considered physically lighter (by male and female respondents), such as weeding, but, in reality, are very tedious, strenuous, and time consuming. There is also a gendered pattern in intra-household decision making authority that varies by source of income, type of expenditure, and farming activity. In general, while women may be consulted in decisions, men often make the final decision. Registered and un-registered local savings groups (SACCOS) are the main source of loans for women as they do not require collateral. Women have limited options for obtaining raw cashew nuts, although a recent GoT amendment to marketing and sales of RCN is intended to improve them. Women's marketing options for processed cashew are generally limited to unspecialized domestic markets, such as street vendors, shops, and local supermarkets.

Improved small-scale cashew processing equipment and training enables WCPGs to dramatically increase their productivity and profitability

Most of the WCPGs that received improved small-scale cashew processing equipment and training reported that the equipment improved their productivity and the quality of their processed cashew. The findings indicate that groups using this equipment can process 3 times as much RCN per day compared with the quantity that they could process before using rudimentary shelling tools. The equipment also enables the treatment groups to obtain about 27 percent more whole white kernels per 80-kg bag of RCN relative to control groups and earn a market price per kilogram of the kernels are about 5 percent higher due to better quality.

Because WCPGs face significant constraints to obtaining formal credit, they report that they often are not able to process as much RCN each season as they would like to as they have limited access to formal credit and are not able to self-finance and self-provide more than an initial aggregate quantity of RCN for processing each season. However, treatment groups were able to take advantage of their significant gains in processing amounts per day by using sales income from their initial stores of RCN input to relieve this credit constraint by self-financing one or more additional tranches of RCN to process during the same season. Subsequently, treatment groups were able to produce about 85 percent more processed cashew per season control groups. This enabled treatment groups to earn almost double the gross revenue per season of control groups and enjoy profits that were 3 times higher.

Continuing constraints for women's empowerment in cashew processing

Despite the success of this intervention for some of the participating WCPGs, the groups and their individuals continue to face various constraints that limit their ability to participate in small-scale cashew processing and to increase the productivity, sales, and profitability of existing groups. First, Tanzanian women continue to face constraints from predominant sociocultural beliefs and customs that result in women having limited control over key household resources, lack of confidence and self-esteem, and limited ability to assert themselves in intra-household decision-making processes. Such constraints also lead to societal assumptions that women do not have sufficiently strong bargaining power and leadership skills needed to engage in more remunerative and market-oriented activities.

Second, accessing raw cashew remains a challenge for women because of their limited access to formal credit and inability to self-finance this input. Despite a recent policy reform by the GoT intended to make it easier for small-scale processors to procure relatively small amounts of raw cashew through an auction or directly from AMCOs (right?), accessing raw cashew remains a challenge for WCPGs. This suggests a need for future research into how the new regulation and its implementation has helped or not to improve WCPGs access to raw cashew.

Third, reliance on sales agents is a major problem for most WCPGs and can result in significant financial losses. Cultural factors limiting women's travel and women's relative inexperience lead most WCPGs to sell their processed cashew through a sales agent. However, the agents typically need to transport their cashew to Dar es Salaam to find a buyer and do not provide a partial payment upfront. Often agents fail to pay what was agreed, payments are significantly delayed and occasionally never made. The challenge is due to a general lack of effective contract enforcement combined with the groups' inability to rely upon social pressure to enforce the agreement, as may be possible if the agent is from their ward. While GoT has a policy that governs the marketing of raw cashew as well as enforcement mechanisms, to our knowledge, there is no GoT policy governing the marketing of domestically processed cashew. The lessons learned from the regulation of raw cashew sales could be applied to the sale of processed cashew (domestically). One alternative used by a few

WCPGs is for the women to include some young men as members, as men have a comparative advantage in both sourcing inputs (raw cashew) and marketing processed cashew.

Need for improvement in SIDO group formation and selection process

While the SIDO intervention was quite successful for many participating WCPGs, some groups received processing equipment were never able to take advantage of the potential benefits of the improved equipment because they could not effectively work as a group. That is, they were unable to manage intra-group decision making and disagreements, leading some to stop using the equipment entirely or even disband the group. These groups appear to have lacked trust (social capital and cohesion), experience working together, and common interests and incentives needed to work together. A main reason for this is that it appears that some of the WCPGs selected by SIDO to receive the program benefits had been recently formed in response to SIDO and/or local politicians publicizing the opportunity (to receive free processing equipment), which could only be accessed by a WCPG.

Second, SIDO's selection process did not sufficiently engage with groups under consideration to assess the expectations and objectives of group members and their prior experience working together in a group setting. Third, it appears that SIDO did not provide prospective or selected groups with training aimed at facilitating group interaction and building decision-making and conflict-resolution skills. These results imply that SIDO should consider engaging in a longer and more in-depth group evaluation and selection process, so as to improve their ability to select groups for their intervention with characteristics more consistent with effective group interaction.

Future research is warranted into whether recent reforms to regulations concerning access to raw cashew nuts by local processors from auctions or Agricultural Marketing Cooperatives (AMCOS) have improved WCPG access to raw cashew and what constraints may remain to their access to their main input in cashew processing.

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ACRONYMS AND ABBREVIATIONS

AMCO	Agricultural Marketing Cooperative
CBT	Cashew Board of Tanzania
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
GoT	Government of Tanzania
IFPRI	International Food Policy Research Institute
KII	Key Informant Interview
LGA	Local Government Authority
MoA	Ministry of Agriculture
MALF	Ministry of Agriculture, Livestock, and Fisheries
MSU	Michigan State University
PRCI	Feed the Future Innovation Lab for Policy Research, Capacity, and Influence
Pro-WEIA	Project-Women's Empowerment in Agriculture Index for Value Chains
RCN	Raw Cashew Nut
SIDO	Small Industry Development Organization
TWRRB	Tanzania Warehouse Receipts Regulatory Board (TWRRB)
TWLB	Tanzania Warehouse Licensing Board
TIC	Tanzania Investment Centre
TNBS	Tanzania National Bureau of Statistics
TNPS	Tanzania National Panel Survey
TZS	Tanzanian Shilling
UNIDO	United Nations Industrial Development Organization
UNCTAD	United Nations Conference on Trade And Development
VC	Value Chain
WEAI4VC	Women's Empowerment in Agriculture Index for Value Chains
WCPG	Women's Cashew Processing Group

I. Introduction

Increased participation of smallholder farmers in the production and sale of higher-value crops has the potential to lift them out of low-productivity subsistence farming and into more commercial and profitable agriculture (Barrett 2008; Von Braun et al. 1994; Timmer 1988). However, women and other disadvantaged groups often face additional constraints to participating in value chains, markets, and business activities and interventions intended to facilitate this shift towards commercialization have often resulted in women having less control over the production decisions and income earned (Andersson Djurfeldt 2018; Fischer and Qaim 2012). In addition to improving gender equity, women's empowerment in intra-household decision-making regarding crop cultivation and marketing decisions and the allocation of crop sales income is important because it can have a positive effect or household food security and nutrition. This is demonstrated by evidence from Africa showing that women are more likely than men to spend additional income under their control on food for the household and on increased diet diversity (Hoddinott and Haddad, 1995; Duflo and Udry, 2004; Fischer and Qaim, 2012; Ogutu et al, 2020; Nikiema and Sakurai, 2021). This evidence demonstrates how vital it is for value chain interventions to consider the role that gendered social structures and institutions play in shaping the roles, opportunities, constraints, and behaviours of both men and women along agricultural value chains (GIZ, 2013; Poulson, 2016). Likewise, they also need to identify value chain entry points where interventions may increase women's participation in and benefits them – particularly in the case of higher-value agricultural value chains for more commercialized crops (Wyrod, 2008; Parpart et al., 2002; Laven et al., 2009).

In sub-Saharan Africa, men and women often have distinct roles in agri-food value chains. Though gender roles and dynamics depend on the value chain in question (Rubin, Boonabaana, and Manfre 2019) some common trends are apparent. For example, women often take charge of activities such as weeding, harvesting, processing, and storage of food crops, while men often control the marketing of surplus food crops as well as the production and marketing of cash crops (von Braun et al, 1995; Ellis, 2007; Mashma, Thebe, and Uzokwe, 2018). In addition, women's participation and agency in crop value chains tends to be disproportionally within less-profitable value chains and within lower-value nodes within them. se value chains. A key reason for these two patterns is that women typically face a variety of constraints to active engagement in market-oriented farm production activities and enterprises and in higher-return nodes of agricultural value chains, many of which are rooted in local socio-cultural norms. For example, due to socio-cultural norms, rural women often have limited control over productive assets such as land and livestock -- relative to men – and lower levels of human and social capital (Quisumbing et al. 2015). Women's limited access to productive assets and education subsequently constrain their access to credit, financial services, and new technologies, more so than men (Coles and Mitchell, 2011; Dolan, 2001; FAO, 2011; Fletschner and Kenney 2011; Quisumbing et al. 2015; Mashma, Thebe, and Uzokwe, 2018).

Socio-cultural norms can also constrain women's participation in markets – such as mobility restrictions that women often face (Farnworth, 2011; Waithanji et al., 2013). Likewise, the social norms that result in women doing most if not all unpaid domestic work in a household (apart from

that done by children) – while also spending as much if not more time than men on household farm activities -- mean that women typically have greater daily and weekly time burden relative to men (Budlender, 2008; Ellis et al., 2006; Ilahi, 2000; Kes and Swaminathan, 2006; Leavens et al., 2019). The combination of asset, time, and mobility constraints that women often face can subsequently make it more difficult for them to meet the standards (e.g. volume, quality) required to participate in higher-return crop markets and/or sell to key buyers within them (Reardon et al. 2009). These constraints vary for different groups of women—for example, female household heads face greater resource constraints that limit productivity and thus market participation, while women from male-headed households are disincentivized from market participation due to their more limited control over income earned (Andersson Djurfeldt, 2018).

Cashew nut production, processing, and trade are major sources of rural employment, income, and foreign exchange for Tanzania (TIC, 2019) – particularly for women (Mpenda, 2020). Cashew is the most widely grown cash crop in Tanzania, accounting for 62% (811,733 ha) of area planted to the country's top five cash crops (MALF, 2021) and an average of 49% in net export value of the same crops (including processed products) between 2012 and 2021. It is predominantly grown by smallholders in Tanzania with around one hectare of land, who account for 85% or more of cashew producers in the country (UNIDO, 2011). The cashew nut value chain is also particularly important for women in Tanzania, as they play a major role in various nodes of the cashew value chain. For example, they provide about half of the labour in farm-level cashew production, 90-95 percent of the labour in medium- and large-scale cashew processing, and virtually all the labour in and management of small-scale or "cottage" processing (Mpenda, 2020).

Growth in international market demand for cashew nuts and related products has been strong over the past 10 years and is projected to continue. Among cashew producing regions of the world, Africa has the most potential to produce and export additional amounts of cashew to meet this growing demand. Tanzania is the world's fifth largest producer of cashew nuts, and its third largest exporter. In addition, Tanzania grows relatively high-quality cashew nuts in sufficient quantities to support a national processing sector, at a time of the year when there is consistent international demand for exported cashew given that few other cashew exporting countries harvest at that time (Kilpatrick, 2013). However, despite this clear growth opportunity for the cashew nut value chain in Tanzania, it has long operated well below its potential for generating rural employment, rural household income and foreign exchange. For example, farm-level cashew nut productivity remains low in Tanzania, with yields between 250kg-450kg per hectare as compared to 1,000 kg per hectare or so in India and Vietnam (ibid, 2013). Second, the country only processes about 10 to 15 percent of its total production, while exporting the remaining share unprocessed (Tanzania Investment Centre, 2019; Kilpatrick, 2013). Together, this represents a significant loss in foregone value addition, job creation, rural economic growth, and foreign exchange for the country (UNCTAD, 2021). Because cashew is predominantly a smallholder crop in Tanzania, widespread improvements in the productivity of cashew nut production and processing could generate significant increases in rural household employment and incomes for farm households with relatively limited resources (ibid). Given the predominant role of women in both cashew production and small-scale processing, improvements in the productivity of cashew nut production and processing also provide an opportunity to improve the incomes of rural women.

In recent years, the potential for growth in cashew production and processing in Tanzania has attracted significant investment from the government, development partners, and the private sector. Most of the investments have focused on increasing production through the introduction of high yielding varieties of seed saplings and greater use of pesticides and fertilizer; improved efficiency in the marketing of raw cashew nuts; and some limited investment in processing. The cashew value chain is also among the prioritized commodities in the most recent Agricultural Sector Development Strategy of the GoT (ASDS II-2015), which has led the GoT to begin promoting cashew cultivation in several regions where it has not previously been grown (MALF, 2019). The GoT has also identified the cashew nut value chain as having great potential for women's economic empowerment. This has led to several interventions in recent years by the GoT and development partners intended to support and increase women's engagement in the cashew value chain, including an intervention by the Small Industries Development Organization (SIDO) of the GoT in 2007. This intervention has provided selected women's cashew processing groups with improved small-scale cashew processing technologies and training in using it to improve the quality and quantity of their processed cashew (UNIDO, 2010).

While six previous studies have examined various aspects of the cashew value chain in Tanzania, four of them included little to no discussion on women's roles and participation in different segments of the value chain (UNIDO, 2011; Kilama, 2013; Kilpatrick, 2013; Tanzania Investment Centre, 2019). By contrast, a study done by Mpenda et al., (2020) examines women's involvement in various nodes of the cashew value chain, highlighting prospects and challenges for women's empowerment. Similarly, Mihyo et al., (2019) found that while women participate in activities along the cashew value chain, they face more constraints than other social groups to increasing productivity, meeting quality standards, and business transactions, especially in production, processing, and marketing, due to lack of productive resources knowledge, and social networks. Both studies find that Tanzanian women's involvement and opportunity are highest within the processing node, particularly small-scale "cottage" processing (Mpenda, 2020; Mihyo, 2019) undertaken by women's cashew processing groups of varying sizes, typically including 5-15 members (Mpenda, 2020). However, women's small-scale cashew processing activities still depend on crude, hazardous, ineffective, and inefficient inputs and implements as well as low-level technologies, which constrain the productivity of their cashew processing (Mihyo et al, 2019) and the quality of the processed cashew nuts (Mpenda, 2020).

This study builds on the previous work by Mpenda (2020) and Mihyo et al. (2019) in several ways. First, it uses qualitative research methods to explore opportunities for and constraints to women's empowerment in cashew production and processing in more depth than the two prior studies, particularly with respect to the productivity and marketing constraints of women's cashew processing groups. Second, its qualitative focus group discussions involve more groups than Mihyo et al (2019), and while that study had FGDs in Lindi region alone – the second largest cashew producer in the country – this study focused on two districts within the largest cashew producing region, Mtwara, and one in Lindi. Third, this study is the first to assess the performance of SIDO's intervention to assist women's small-scale cashew processing groups by providing improved small-

scale processing equipment and training in how it can be used to not only shell cashew nuts more quickly and safely, but also produce higher-quality cashew kernels.

The study addresses three main research questions: First, what are the main opportunities for and constraints to women's empowerment within the production and processing nodes of the cashew value chain in Tanzania? Second, how effective has the SIDO small-scale cashew processing equipment intervention targeted to women's cashew processing groups been in relieving constraints faced by these groups to improving the productivity and profitability of their cashew processing activities? Third, are there ways in which the effectiveness of this SIDO intervention can be improved and any findings that are relevant to similar interventions aimed at increasing women's empowerment in the cashew value chain?

To address these questions, the survey team collected qualitative and quantitative primary data in three districts from the Mtwara and Lindi regions of southern Tanzania, which together account for 82 percent[1] of the country's annual cashew production. The qualitative research included in-depth qualitative Focus Group Discussions (FGD) women's cashew processing groups (WCPGs), Key Informant Interviews (KIIs) with individual women from the WCPGs, and KIIs of individual male and female cashew farmers and other key actors along the cashew value chain. Quantitative data was also obtained from WCPGs related to their processing costs, productivity, and gross revenues from sales of processed kernels.

The rest of this paper is organized as follows. Section 2 provides background on the cashew value chain in Tanzania, gendered roles within it, and the SIDO intervention. Section 3 then describes the methods and data used to address the research questions. Section 4 provides research results and discussion, followed by conclusions and policy implications in Section 5.

[1] Authors' calculations from the 2019/20 National Sample Census of Agriculture: Key Findings for Crop and Livestock Sectors and Fish Farming (TNBS, 2021).

II. Background

Women in Agriculture in Tanzania

In the past 25 years, Tanzania has passed or adopted various laws, policies, and strategies intended to reduce barriers to gender equality in economic, social, and political aspects of the country[2]. The country has also improved gender equality in economic activities by some measures. For example, it has one of the highest female labour force participation rates in Africa, and women in Tanzania have gained access to a wider range of economic activities; the ratio of female to male participation rates in wage and salaried work increased from 35 percent in 2000 to 64 percent in 2019 (World Bank, 2022). However, the financial rewards of women's participation continue to lag those of men, women continue to earn lower wages than men, are concentrated in less-profitable activities and jobs, run enterprises in less productive sectors, and have fewer opportunities for business scale-up or career advancement (Mihyo, 2019). Within the agricultural sector, women obtain lower crop yields on average, are less likely to own or control land, and continue to face greater barriers to participating in the production and marketing of higher-value crops (World Bank, 2022).

Although the statutory Land Act (1999) and the Village Land Act (1999) give women the right to own land (Mihyo, 2019), Tanzanian women still face a considerable gender gap in terms of ownership and control of assets like land and housing (World Bank, 2022). This is explained in part by the fact that most land in Tanzania is still under customary tenure, and customary laws, rules and procedures continue to discriminate against women's ability to own or inherit it (Mihyo, 2019). In addition, for land and housing that is formalized, women are much less likely to have their name on the title or deed (World Bank, 2022). Subsequently, men are more than three times as likely as women to be sole owners of land or housing, while most women own such assets jointly with their husband (ibid, 2022). While women in farm households may have a role in intra-household decisions regarding land use and cropping decisions, their influence is sometimes limited, and they do not often make final decisions (Mihyo, 2019).

Tanzanian women also continue to struggle to access formal financial services, due in part to lower earnings (and thus savings), limited access to key types of collateral (such as land, house); and a lack of financial products designed specifically for women, which have lower collateral requirements (ibid, 2022). While continued reform of laws and more effective implementation of them is needed for women's empowerment in Tanzania, change is also needed in socio-cultural norms that continue to constrain Tanzanian women in both farm and business activities (Mihyo, 2019).

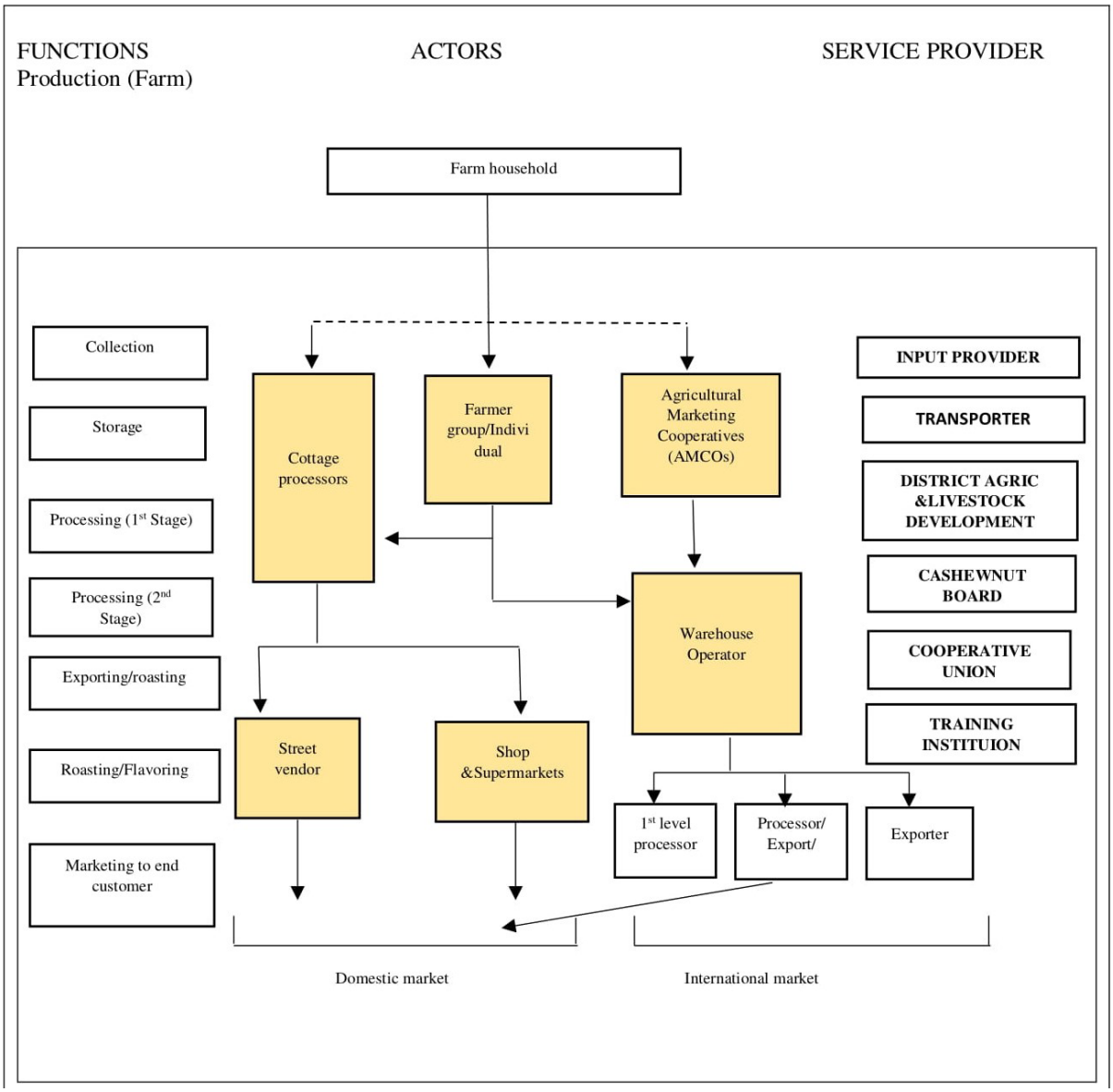
[2] The Tanzania Development Vision 2025 emphasizes the county's commitment to promoting gender equality in these contexts, a National Strategy for Gender Development (NSGD) was adopted in 2000, and gender has been integrated into the National Five-Year Development Plan (2021/22-2025/26) (World Bank, 2022).

Cashew Nut Value Chain in Tanzania

Introduction

The value chain is a concept that describes the full range of activities that firms, farms, and workers do to bring a product from its conception to its end use and beyond (Porter, 1985, Ponte, 2010 and GIZ 2013). The approach focuses on 'vertical' relationships between economic actors who participate in different stages of the production process of a commodity as it moves from different stages of production, processing, and marketing (distribution, domestic retail, export) to end consumers. The cashew value chain shown in Figure 1 illustrates the actors' position in the chain and flow of products (UNIDO 2011).

Figure 1. Tanzania's cashew value chain



Source: Adapted by the authors from UNIDO (2011)

Cashew nut production

The production node comprises individual farm households and groups of farmers. A farm household means one or more persons sharing a single residence on a farm ranging in size from 0.5-10ha, where the primary occupation of the household is farming. Farmer groups are voluntary community organizations that differ in size and degree of interaction among members but have common interests in cashew production.

Ninety percent of the area planted with cashew in Tanzania is found in three coastal regions -- Mtwara, Lindi, and Pwani, though cashew is also an important cash crop in the Tanga and Ruvuma regions[3]. Smallholder cashew growers in Tanzania face a wide range of constraints to improving the productivity and profitability of their cashew production, including insufficient access to newer and/or improved planting material, seasonal inputs, such as pesticides and fungicides, and credit (UNIDO, 2011). Inadequate access to quality extension and cooperative services also contributes to poor management of cashew production, post-harvest storage, and marketing (ibid, 2011).

Cashew nut processing

The processing node comprises small-scale, medium, and large-scale processors categorized based on the size of operations and type of processing technologies. Small-scale cashew processors, sometimes referred to as "cottage" processors, operate out of their homes and typically use manual methods to de-shell, peel, and roast cashew nuts. Processors can also be described by level: 1st level processors are typically small processors contracted by medium or large-scale processors to only deshell the nuts, while 2nd level processors are mostly exporters who either perform all processing activities or purchase unpeeled cashew kernels, then peeled, sort, pack, and export.

Marketing of raw and processed cashew nut

The marketing node is comprised of both low-level markets (street vendors, shops) and high-level markets (supermarkets, exports). All the low- and most high-level markets supply only processed cashew nuts i.e. cashew kernels, while the export market supplies both raw and processed cashew nuts. Street vendors mostly sell roasted or fried cashew kernels for direct consumption on the roadside and at traffic lights. Shops and mini supermarkets sell raw, roasted, and fried cashew kernels. The raw kernels are sold for either direct consumption or further processing. Contrary to shops and mini supermarkets, large supermarkets are an outlet for only raw or roasted cashew kernels. The exporter exports only raw cashew kernels to countries such as Middle East, Europe, and USA while India receives only raw cashew nuts and not kernels.

There are two main marketing channels for raw and processed cashew nuts produced in the main growing regions of Mtwara, Lindi, and Pwani: the domestic market and the export market. In the domestic marketing channel, small-scale, cottage processors (almost entirely women's cashew processing groups) source raw cashew nuts from their own household production, process them, and sell both raw kernels (white kernel) and processed kernels (roasted, fried, and ground) to local wholesalers or retailers (street vendors and supermarkets). In the export marketing channel, growers

[3] Authors' calculations from the 2019/20 National Sample Census of Agriculture: Key Findings for Crop and Livestock Sectors and Fish Farming (TNBS, 2021).

sell their raw cashew through Agricultural Marketing Cooperatives (AMCOs) into the warehouse receipt system. Within the warehouse receipt system, raw cashew nuts are sold to exporters or exported directly by vertically integrated processors. This study focuses on three nodes of the domestic cashew marketing channel where women play an integral role: production, processing, and marketing of kernels, primarily for the domestic market.

AMCOs are registered groups of cashew producers that collect raw cashew nuts [4]from members and deliver these to warehouses for bulk selling. The warehouse provides a receipt upon delivery of the cashew nuts, which is submitted to the cooperative union, which then distributes payments to its members (both initial payment upon delivery of cashew at the primary society and final payment once the cashew is sold). The cooperative also distributes inputs and cashew-related information to its members. The cooperative union, which is the organization of member primary societies is responsible for cashew grading and auction under the Cashew Board of Tanzania (CBT), and procurement of inputs such as pesticides, fertilizer and packing materials for distribution to farmers through primary societies.

Warehouses are privately owned by private individuals or cooperatives. The warehouses operate following warehouse receipt system standards set by the Tanzania Warehouse Receipts Regulatory Board (WRRB) and Tanzania Warehouse Licensing Board (TWLB). The warehouses are managed by warehouse operators responsible for managing the supply chain process, handling vendor orders and interactions, implementing safety regulations, and checking all packages for quality assurance. Cashew nuts are stocked in designated lots separated for each cooperative.

Women's roles within the Tanzanian cashew nut value chain

Women have key roles in many of the nodes along the cashew value chain in Tanzania. In the production node, women provide about 60% amount of the labour for cashew production (Mpenda, 2020), although women have limited input into land management decisions related to cashew cultivation (Mihyo et al., 2019). Moreover, they are less likely than men to own or have access to land, obtain inputs for cashew production or processing, access credit, and obtain membership in marketing cooperatives (Mihyo et al., 2019). In the processing node, women account for 90-95 percent of workers in established medium- to large-scale private sector cashew processing factories (Mpenda, 2020). Small-scale, "cottage" processors are almost entirely women, working either as individuals or as members of a WCPG (ibid). While women dominate cottage processing, they predominantly use crude implements and low-level technology, which results in low processing productivity and profitability (Mpenda, 2020; Mihyo et al, 2019). Women process and sell raw or roasted cashew kernels[5] directly to other processors, exporters or retailors. Most women processors sell cashew as a group around the cottage processing facility, while a few sell cashew as roadside vendors.

[4] Raw cashew nuts are nuts that have not been altered.

[5] Roasted cashew kernels are kernels that have been roasted, usually sprinkled with salt or other seasoning.

Selling into the domestic and export market channels typically requires moving the processed cashew far from the village to larger markets. WCPGs typically do not do this themselves given time and mobility constraints (Pavanello *et al.,* 2017). Another reason is their inexperience and limited bargaining power in negotiating such sales in larger markets relative to men who are typically the buyers. Given these constraints, WCPGs typically sell their processed cashew through one of two ways. Some use male sales agents, who usually take the cashew to a large towns or cities and repay the group only after they manage to sell the cashew. Others employ young men from the village to sell processed cashew as street vendors; the young men do not face mobility restrictions and often may not be fully employed (Mihyo, et al. 2019). They get paid after the products have been sold, and often receive a very small commission for selling the product. Storage of processed cashew is difficult for WCPGs because of high humidity and their insufficient access to proper storage bags.

SIDO intervention in small-scale cashew processing

Using traditional processing technologies, the process by which WCPGs in Tanzania process raw cashew nut (RCN) involves four main steps: (i) boil the raw cashew in water to soften the outer shell, using wood as the fuel source; (ii) crush the nuts using an iron bar; (iii) manually peel the inner shell/membrane away from the nut using a kitchen knife; and (iv) dry the nuts in the sun (Azam-Ali et al., (2001). Using this technology, SIDO estimated that a group with five women could process one 80 kg bag of raw cashew nuts per day.

The SIDO intervention examined in this study began in 2014 and has provided selected WCPGs with free improved cashew processing equipment, training it its use, and assistance in linking the groups with micro-finance institutions. The package of tools for small-scale cashew processing provided by SIDO included a boiler, drier, and a mechanized hand-operated crusher that can crush one nut at a time. According to SIDO, a group with five women using the improved equipment could process two to three 80 kgs of raw nuts in one day, as compared with one per day using the traditional equipment – a significant increase in labour productivity. Yet, to take full advantage of this equipment, women's groups need to obtain greater quantities of raw cashew, possibly as much as 4 times the previous amount. As part of the intervention, SIDO thus introduced WCPGs to micro-finance institutions and provided training. This was intended helped to alleviate the credit constraints typically faced by WCPGs, enabling them to purchase larger quantities of raw cashew.

An additional benefit of the improved technology package is that using a drier enables women's groups to produce both high quality processed cashew that is unroasted (white kernel) and roasted (brown kernel). Driers help to easily monitor moisture content by controlling the correct level of dryness through colour, and texture observation relative to boiling nuts in pots. Driers can also process larger volumes of cashew with few broken pieces. Groups without a drier can still produce both white and brown kernels using traditional method, however, this often results in overheating and over drying, negatively affecting the quality of the processed cashew. Because brown kernels are sold at a higher price than white kernels, having access to a drier enables groups to add value to their cashew nuts more easily and efficiently. Thus, the intervention is expected to improve both the productivity of women's time spent in small-scale cashew processing as well as the quality of the processed cashew, which should increase net returns to WCPGs.

III. METHODOLOGY AND DATA

Overview

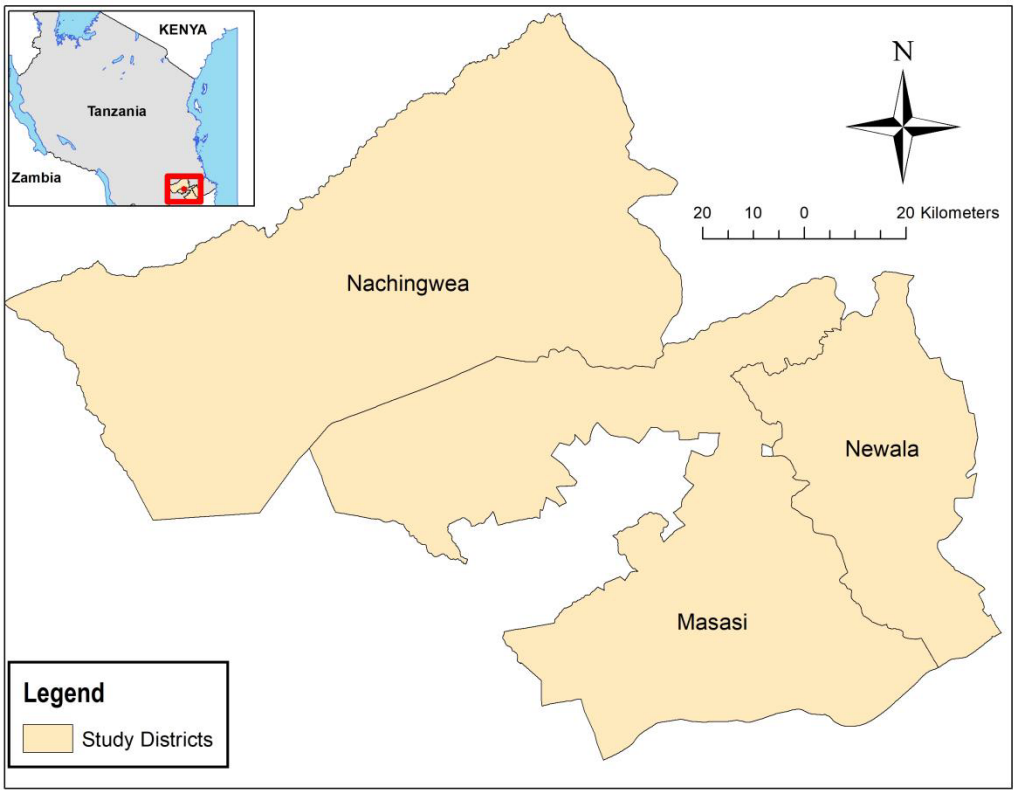
This study is based primarily on qualitative and quantitative data collected by the authors from a range of actors in production and processing levels of the cashew nut value chain in three (?) districts of the Mtwara and Lindi regions of Tanzania. Most of the primary data collected was obtained through qualitative methods including Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). The study focused primarily on qualitative approach for primary data collection was that, first, there are few existing studies of the Tanzania cashew value chain that have an explicit focus on both women's roles within it and opportunities for and constraints to women's empowerment. Second, semi-structured, in-depth qualitative interviews and FGDs facilitate the investigation of a broad range of research questions while also providing flexibility and depth as needed. This included semi-structured, in-depth Focus Group Discussions (FGDs) with selected Womens' Cashew Processing Groups (WCPG) and semi-structured Key Informant Interviews (KIIs) with individual female members of WCPGs, female and male cashew producers, and government officials from the selected Local Government Authorities (LGAs) and the Small Industry Development Organization (SIDO).

The study also collected primary quantitative data from VC participants through specific quantitative questions included in FGDs with WCPGs and KIIs of SIDO representatives and leaders of WCPGs. Although the Tanzania National Panel Surveys (TNPS) of 2008/09, 2010/11, 2012/13, 2015/16, and 2018/19 contain quite a few observations of farm households that grow cashew, unfortunately, these surveys did not collect any gender-disaggregated information on input and labour use in cashew production, quite limited information on marketing of raw cashew, and no information on household cottage processing of cashew or women's involvement in cashew processing groups.

Selection of study area

The study area was selected after reviewing the most recent provincial- and district- level data on annual cashew production from the Ministry of Agriculture (MoA). This data confirmed that a high concentration of national cashew production comes from regions in the Southern Coast of Tanzania, particularly Mtwara and Lindi regions (see figure 2), which together produce 82% of the country's cashew. Thus, data collection efforts concentrated in these two regions where the bulk of the country's cashew is produced and processed.

Figure 2. Map of selected districts in Mtwara and Lindi regions



Study design and selection of women's cashew processing groups for FGDs

Process of selecting WCPGs for Focus Group Discussions

Within Mtwara and Lindi, SIDO had implemented the intervention in 9 districts: 4 of the 7 districts from Mtwara and all 5 from Lindi. Within these 9 districts, a total of 31 WCPGs had participated in the intervention as of November 2021. The process by which the study team randomly selected Women's cashew processing groups (WCPGs) for in-depth, semi-structured qualitative FGDs is as follows. First, three districts were purposively selected for this study based on their high cashew production levels as well as their number of active WCPGs -- both intervention participants and non-participants.

Second, the Cashew Board of Tanzania (CBT) provided a list of all active small-scale WCPGs in the selected regions. The study team also obtained a list of "active" WCPGs in each district from SIDO, where the intervention was carried out. SIDO defined a WCPG as "active" if the group had previously collectively processed raw cashew nuts and was known to still be involved in this activity. SIDO considered these "active" groups to be eligible to participate in the intervention. From their list of active groups, SIDO had selected a subset of groups that they invited to participate in the

intervention. The study team cross-checked the lists of active WCPGs from CBT and SIDO to determine which groups from the overall CBT list were involved in the SIDO intervention and which were not. In each of the three selected districts, the team randomly selected 3 groups from the list that had participated in the intervention ("treatment" groups), as shown in Table 1.

Table 1. List of Women's Cashew Processing Groups selected for the study

Region	District	Treatment Group		Control Group	
		WCPG	**AMCOS**	**WCPG**	**AMCOS**
Mtwara	Newala TC	Maumbika	Machi	Makote	Makote
		Nangwala	Langwala	Tulindane	Tulindane
		Luchigu		Mkombozi	
	Masasi	Mpeta	Nanjota	Chungutu	Mijelejele
		Nanjota	Mnavila	Mijelejele	Ebutuone
		Mnavila		Makong'onda	
Lindi	Nachingwea	Mkulungulu	Nachingwea	Ruponda	Umoja
		Nachingwea	Boma	Kipimi	Vuwami
		Boma		Luchingu	

A fundamental challenge in assessing the impact of a program intervention is that one needs to compare the behavior and outcomes of individuals, households, or groups who participate in a program with their behavior and outcomes had they chosen to not participate. However, as and after a program participant engages in the program, their behavior and outcomes can only be observed as program participants, as their behavior and outcomes had they chosen to not participate are, by definition, unobservable. One solution to this challenge is to select a sample of non-participants who have pre-participation characteristics similar to those of participants – called a "control group" -- and observe the behavior and outcomes of these non-participants during the same period of time in which participant outcomes are observed.

Thus, to serve as an effective control group, a WCPG should be as similar as possible to treatment groups, apart from their participation in the intervention - particularly with respect to group characteristics and other factors that could be correlated with both a group's probability of participation within the intervention and the productivity and profitability of the group's cashew processing efforts after they participate in the intervention. Two main criteria were used to try to control for potential differences in the characteristics of participating ("treatment" group) and non-participating ("control" group) WCPGs. First, both treatment and control groups were selected from a list that contained only "active" WCPGs, as defined by both the CBT and SIDO. Second, a WCPG's access to markets (for labor, various goods and services) can have a strong influence on the input and output prices that it faces for those goods and services. Thus, to control for market access across treatment and control groups, the team identified wards within each of the 3 selected districts that were physically adjacent to the ward in which a "treatment" WCPG had been randomly selected.

The team then generated a list of all non-participating yet active WCPGs in those adjacent wards. From that list, one non-participating "control" WCPG was then randomly selected. The reason for

selecting a control WCPG from a ward adjacent to a ward containing a "treatment" WCPG was to avoid the potential for "treatment spillover effects" from having two WCPGs in the same ward while assuring that selected WCPGs would have similar market access. The team repeated this process to select one "control" WCPG for each of the three treatment WCPGs in that district. The process was repeated for the other 2 intervention districts, which generated a total sample of 18 groups with which the team engaged in FGDs (9 groups that participated in the intervention; 9 that did not).

Caveats

It is important to note several caveats about the qualitative and quantitative analysis in this paper. The first is that the small sample size and qualitative approach imply that the results cannot be interpreted to be representative of the underlying population of WCPGs and individual cashew farmers. Employing a qualitative research approach involves an inherent tradeoff between the representativeness of study results and the depth of understanding that can be gained from in-depth, semi-structured focus group discussions and key informant interviews. The study team chose to primarily use qualitative research methods given both the lack of any prior research on the SIDO intervention and general lack of household and individual-level survey data in Tanzania that is gender-disaggregated to the level required to address the study's research questions. It is important to note that this small sample size limitation is true of nearly all value chain studies (and the "case study" approach in business literature", yet they remain invaluable research outputs for improving knowledge and understanding of actors within a given value chain and their behavior, the structure of the value chain, and various aspects of its performance.

Second, while the sampling approach described above was designed with the objective of generating both an in-depth and general understanding of the opportunities and constraints facing WCPGs and how the SIDO intervention may have affected those, budget constraints limited the number of districts that could be visited and WCPGs that could be interviewed. This limits to some extent the ability of the control group WCPGs to represent a true counterfactual of the economic behavior and outcomes of participating WCPGs had they not participated. Nevertheless, the FGDs and KIIs highlighted several opportunities and constraints that were common to program participants and/or non-participants, and the study team was also able to ask participating WCPGs about their behavior and outcomes prior to program participation.

Third, it is important to note that it may well not be possible for any subset of non-participating WCPGs to serve as a true counterfactual for participating WCPGs in the event that SIDO's selection of "active" WCPGs was not random. That is, if group characteristics used by SIDO used to select the WCPGs invited to participate in the intervention included some that were not reported to or observed by the study team, and if some of the characteristics are systematically different between the participating and non-participating WCPGs, then it is possible that our WCPG productivity and profitability analysis might over- or under-estimate the impact of the intervention of those outcomes. Unfortunately, SIDO did not provide information on their selection criteria of WCPGs from within those defined as "active". An implication of this is that if the characteristics of control groups sampled by the study team are not similar to those of the WCPGs selected by SIDO for assistance, then the observed costs, productivity, and profitability outcomes of those control

groups may not represent a true counterfactual. If that is the case, then the study findings regarding any differences in outcomes between treatment and control groups could be biased upward or downward.

Selection of individual women engaged in cashew processing for interview

To identify individual women from a WCPG for an interview, the team randomly selected one woman from each of the 18 FGDs with WCPGs and asked if she would be willing to participate in a separate qualitative Key Informant Interview. The aim was to obtain her individual perspective on constraints that she may have faced in participating in a cashew processing group, the constraints that women in her community may face, the opportunities (benefits) that she and her family obtain from that activity and the operational cost and benefit that the group get with/without SIDO intervention.

Selection of individual male and female cashew growers for interview

Given that nearly all cashew growers sell surplus cashew through an AMCO in their ward and that AMCOs maintain lists of members, such lists can provide a sampling frame of cashew growers close to the AMCOs.

To identify male and female cashew growers for KIIs, the team first obtained a list of AMCOs in each of the 3 intervention districts from the District Agricultural, Irrigation and Cooperative Officer (DAICO) of each district. For each district, the team then identified all AMCOS located in the wards where treatment and control WCPGs had been selected for FGDs and randomly selected 4 AMCOs. Next, the team contacted a leader of one of the selected AMCOs and requested a list of cashew growers registered with it, and the gender of each grower. One male and one female cashew grower were randomly selected from the list provided by that AMCO, and the two growers were invited to participate in a qualitative KII. This process was repeated for the other 3 selected AMCOs in the district, providing a total of 4 men and 4 women cashew growers in the district. Across all three districts, this process gave a sample of 24 cashew growers: 12 men and 12 women.

Data collection tools

The study relies primarily on qualitative data and quantitative gathered by the authors through semi-structured, in-depth qualitative key informant interviews (KII) and focus group discussions (FGD) with key actors along the cashew value chain, though mainly focused cashew production and processing. A set of quantitative and qualitative data collection tools were developed to guide interviews with actors at various stages of the cashew value chain. This included protocols for KIIs and FGDs at the following stages: (i) Production: KIIs with male and female cashew growers; (ii) Processing: semi-structured FGDs with WCPGs and KIIs with individual women belonging to WCPGs; (iii) Wholesale: KIIs with individual warehouse managers; and (iv) Retail: KIIs with street vendors and supermarket managers. Protocols were also developed for KIIs with local government officials from the district-level government (DAICO) and SIDO. The interviews explored gendered roles within the cashew VC, as well as opportunities and constraints faced by women in various nodes of the cashew value chain, namely production, processing, and marketing.

In designing the KII and FGD protocols, the team drew on qualitative tools developed for the project-level Women's Empowerment in Agriculture Index (pro-WEAI) and the Women's Empowerment in Agriculture Index for Value Chains (WEAI4VC). The tools covered various themes, including women's roles in decision-making around different activities, time allocation, and access to and control over productive resources. Both male and female cashew growers were asked about opportunities and constraints with respect to cashew production, and several questions were focused on women's level of involvement in household decision making in cashew production. For example, respondents were asked who within the household made one of several specific decisions regarding crop production, such as the decision to purchase agricultural inputs and the distribution of labour to various tasks. At the processing level, FGDs with WCPGs and KIIs with individual women from those groups aimed at understanding opportunities and constraints faced by women involved in small-scale cashew processing, the effect of SIDO intervention and the marketing of the processed cashew to street vendors, supermarkets, and large-scale processors for the export market. KIIs were also developed for street vendors and supermarket managers.

Protocols were pre-tested with actors in Morogoro. The remaining protocols were tested in Mtwara TC and revised before proceeding with data collection in the selected districts. A total of 4 protocols were developed: (1) FGDs with WCPGs, (2) individual interviews with women processors, (3) individual interviews with cashew producers and (4) KIIs with vendors, managers, and local government officers. An informed consent form was also developed, read, and signed before conducting FGDs and KIIs. FGDs and KIIs were conducted in Kiswahili language and were tape-recorded with the consent of the interviewees. The tape-recordings were supplemented with shorthand field notes based on observations by the interviewers.

In addition to the qualitative methods noted above, quantitative data was collected from leaders of 12 of the WCPGs involved in FGDs, including those of treatment (6) and control (6) groups from each of the three districts. Leaders were asked about the group's variable costs of processing per 80 kg bag of RCN; fixed costs associated with building, equipment, inspection fees, and other items; their productivity (conversion of RCN to cashew kernels), and average sale price of processed cashew kernels. The study team used this information to construct partial budgets for each group to assess whether group processing costs (variable and fixed), productivity, cashew kernel sale prices, and profitability per day and per season differed between treatment and control groups.

Data processing and analysis

All audio data were transcribed, translated, and double checked for quality and clarity prior to data processing and analysis. Thematic content analysis was then conducted based on the principal concepts and themes, by ordering, structuring, and interpreting the collected data. The themes and sub-themes identified included: knowledge of gender roles in cashew production and decision-making, choice of market channels and decision-making, opportunities, and constraints for women's inclusion in cashew processing and marketing. The qualitative data analysis computer software package NVivo software (version 13) was used to code the transcribed interviews. Deductive and inductive coding was used to extract the themes. Similar codes were grouped together, and themes extracted from the patterns that emerged.

IV. RESULTS AND DISCUSSION

Introduction

The results of this study confirm what was previously found in the literature; that women have more limited opportunities for engagement in the cashew value chain compared to men and that they mostly participate in the production and processing nodes of the value chain. Women in Mtwara emphasized women's role in processing cashew:

> *"Women are more dedicated to processing activities by devoting more of their time, compared to men who do not like to stay in one place for a long time." (Source: FGD Treatment Tumaini Nanjota, Masasi district, Mtwara)*

Social norms in the study areas regarding women's roles and involvement in decision-making, place women at a disadvantage, and limit women's ability to participate in and benefit from the cashew value chain. This is especially the case with cashew production. While women contribute to cashew production, they have little autonomy in production given less access to productive resources, less decision-making authority, fewer choices for marketing cashew. An interview in Makote AMCOS reported that "*involvement of female in decision making with regard to production and income allocation is of a small percentage (Source male producer, Makote, Newala TC Mtwara).* This suggests the possibilities that men exclude their partner in deciding how to allocate farmland for production and income. However, this is not always the case, in Boma AMCOS indicated that women have a great influence on decision making, "*my influence is great even though the final decision is made by my husband" (female producer, Boma AMCOS, Nachingwea, Lindi).*

The women contribution in decision making is attributed with the land ownership and the household structure whether is female or male headed household. Women who tend to have access and ownership of land have autonomy/influence in decision making. It also has the same implication on income allocation obtained from selling Raw Cashew Nut. Whereby other women in FGD reported that "*the decisions to allocate income from Raw Cashew Nut tend to be discussed together between husband and wife" (FGD, Mahumbika, Newata TC, Mtwara)* Therefore, women often lack full control over the benefits of production, including income from the sale of Raw Cashew Nut. Without interventions to address these resource, socio-cultural and institutional constraints, women are less likely to reap direct benefits from participating in cashew production.

In the processing node, women tend to have greater autonomy especially through their engagement in women's cashew processing groups. During the FGD with women in Umoja, they pointed out that:

> *"Women in processing groups ensure inclusion and equal participation in the group decision making. This provides an equal chance of each member to have a say and benefit" (Source: Umoja FGD, in Nachingwe district, Lindi)*

However, some women noted that women are also less likely to be found in leadership roles. For example, when women try to engage in leadership roles, they may face resistance from men who are opposed to women assuming such roles as one of the focus group participants in Lindi pointed out:

> *"Many cultural and religious taboos against women have made many women housewives. Thus, eliminating their power in decisions against men. This makes men distrust women in giving them a chance to try. For example, I was the processing group chairperson but some men in our processing group told my husband I was having an affair with one of the group members. Therefore, my husband stopped me from being the group chairperson, which now makes me a regular group member."*
> *(Source; Kipimi Control FGD in Nachingwea district, Lindi)*

Moreover, women still face considerable constraints in processing, such as inadequate processing facilities, lack of safety equipment, and limited access to markets for processed cashew. Given women's relative autonomy and potential to retain the benefits of their labor, the SIDO intervention targeted this node of the value chain as an entry point to increase women's productivity/profits/empowerment by addressing the constraints in this area.

Women's Engagement in Cashew Production: Opportunities and constraints

Rigid gender division of labor/roles in cashew production

The results of this study indicate that labor allocation for cashew nut production is generally decided by men. Men and women cashew producers and processors (many of whom are also producers) described a rigid gender division of agricultural labour at the household level for smallholder farm cashew production, consistent with the findings of Mihyo et al. (2019) and Mpenda (2020). Gendered tasks in cashew production were similar across all the study communities, including in the treatment and control villages. A number of agricultural production activities are viewed by both women and men as strictly men's work, while others are viewed as women's work.

Both men and women from the focus groups agreed that men typically perform tasks, such as pruning, spraying of fertilizers and pesticides, and transporting cashew from the farm to the household. The same distribution of gender roles is also seen in hired labour. The tasks of spraying and carrying harvested cashew are perceived to be burdensome in nature, and, thus, attributed to men. Many of the men and women participants perceived the tasks women do, such as weeding, picking, sorting, and peeling cashew, as less arduous, even though Pohlmann (2019) indicate that picking and collecting nuts, tasks which are done by women, are actually quite tedious and very time consuming. The perception of the difficulty of men's tasks was highlighted in an interview with a woman processor:

> *"Women and men work together in the fields. But men work mostly in pruning and spraying pesticides. Women do not perform these tasks due to the difficulty of working conditions, such as the weight of the spraying machine. But other tasks, such as weeding and picking cashews, are usually*

done by women and children." (Source; Nanjota AMCOS, Treatment group, women producer interview in Masasi District, Mtwara).

These findings were also discussed during the focus groups, where most participants reported that:

"Women's main activities are sweeping under cashew trees, weeding, and picking cashews, while men perform spraying, pruning, and transportation activities. Women are not doing the activities performed by men due to the difficulty and use of extra physical energy during the work." (Source; Luchigu FGD with women processors, Treatment group in Newala District, Mtwara)

Intra-household decision making regarding cashew production

Women's involvement in household decision making regarding the purchase of chemical inputs for cashew production depends on the manner in which inputs are obtained. For example, these decisions are made jointly when households acquire inputs (such as fungicide) through a pre-financing arrangement with AMCOS, since the AMCOS contract requires both partners to sign. This arrangement theoretically provides farmers with timely access to farming inputs, especially for those cashew producers who would not have been able afford to buy adequate quantities of inputs during the season. However, in some cases, is not a joint decision but rather men who seek advice from their spouse on whether to purchase inputs from AMCOS, and then make a sole decision on input purchases. An overwhelming number of respondents, including both women and men, said something consistent with the following:

"*…sometimes we discuss and make decision together, …[other times,] I advise him on whether to procure inputs from the AMCOS ……*" (Source; women producers, Mnavila AMCOS, Treatment group, Masasi district, Mtwara)

By contrast, men generally have decision-making autonomy on inputs procured directly from agrodealers, such as pesticides and foliar fertilizers, and women are not consulted. Men are considered to be more knowledgeable about chemical inputs, given their role in applying these on the field, as one respondent reported:

"Men are the final decision maker on purchasing agricultural inputs, such as sulphur and booster, because they are the ones who know the type of pesticides to buy because they are the ones who spray the chemical in the field. Women are only informed of what has been done." (Source; woman producer in Nanjota AMCOS, Treatment group, Masasi district, Mtwara)

Land is another essential resource for cashew production. Tanzanian society generally perceives women with access to land as a threat. However, this perception is changing due to education, and there is growing awareness of structural inequalities in society and the need to correct them, including reshaping decision-making processes within households (Badstue *et al.*, (2021). These concur with the study results which indicate that male-headed households have a greater decision-making power over the use and management of land, despite women's participation in production activities.

However, the majority of women participants in the study reported owning some land through inheritance or purchase with their husband's consent, as stated by woman producer at Boma AMCOS: *"I was given a land as a gift during my marriage by my parents."* On the plots of land that women own, they make their own decisions regarding what type and variety of crop to grow and how to market the produce. *"Most of these fields we grow cashews, maize and sesame seeds for income and food"* (FDG, Chungutu WCPG, Masasi district).

In the southern coastal zone, women do inherit land. The only challenge is that they normally leave it under their brothers' custodianship when get married. However, according to the social norms the community believe that women will gain access to land through their husband. These women, without access to their own land, have more limited decision-making autonomy regarding cashew (and other crop) production compared to women who own their own plots of land. Nevertheless, even when women control crop production, they inform their spouse about their agricultural activities, especially if their spouse has migrated. Compared to married women, female household heads have much more autonomy in production:

> "*... sometimes there are households where woman are the one say the final decision, especially widowed women.…(*Source; FGD, Kipimi, Treatment group, Nachingwe)

With regard to access to credit, member-based Micro-Finance Institutions (MFI), specifically Saving and Credit Cooperative Organizations (SACCOs) and Village Community Banking (VICOBA), were mentioned as the most popular sources of loans in the study area. The findings indicate that there is a gender pattern in borrowing behavior. Women generally obtain small loans to cover household expenditures, such as health care costs and education fees. Men have access to larger loans from SACCOs and banks for business operations and the purchase of agricultural inputs. A woman producer in Lindi described the gender pattern of borrowing:

> *"Women mostly take out small loans, which are easy to pay back; but men take out big loans to build houses." (Source: female individual producer, Nachingwea district, Lindi).*

Women tend to acquire loans through groups since the requirements for loan access are less stringent compared to SACCOS and formal banking institutions, such as the National Microfinance Bank (NMB) and CRDB bank. Women's inability to access bank loans is due to their lack of collateral given that they own fewer assets, compared to men.

> *"I have never borrowed other than borrowing from our women's group. Sometimes for women to access loans, they have to form and register a group" (Source; Tumaini FGD women producer in Masasi district, Mtwara)*

Men are less likely to secure loans from groups compared to women, due to small amount of loans offered. Men also emphasized having access to more sources of credit, as demonstrated by this quote from a male producer in Masasi District:

"People often borrow inputs or money from MFIs for field activities, such as pesticides and sprayers. However, some men and women find it difficult to access loans until they join a registered or unregistered social group. Loans can also be accessed through banks, for example, a year ago, NMB lent me money to buy a tractor, which I used to cultivate my 60 acres of farmland and neighbors' fields at an average fee of TZS 75,000 per acre." (Source; Nanjota male individual producer in Masasi district".

Household decisions regarding the sale of raw cashew

Cashew producers are required by law to sell their raw cashew nut to AMCOS. Decisions regarding how to allocate raw and processed cashew for sale depends on a woman's marital status and land ownership. In most male-headed households men decide to sell the bulk of their raw cashew through AMCOS, while retaining a small amount for further processing at home. However, in other cases, men and women jointly decide how much to sell through AMCOS and how much to keep for processing.

"I normally agree with my wife on how much to sell to AMCOS and how much to process" (Source: Male producer, Machi AMCOS Newala district)

Female-headed households have autonomy in decisions regarding where and how much to sell raw and processed cashew. Additionally, they are other cases where married women own a family cashew plot through inheritance or purchase. Most of these women have control over cashew production on these lands, starting from cultivating, handling, harvesting, and selling cashew. This was stated by women processors in Masasi District.

"*Many of the cashew plots in our society are owned by men, but we purchase land to grow cashew mainly for processing….Sometimes we may decide to share with our husband on the loss or benefits from the cashew plots." (FGD, Nanjota WCPG, Masasi district)*

In other cases, women purchase a farm specifically for growing cashew trees as a means to obtain raw cashew nut for processing. This occurs when the amount of raw cashew nut allocated by the husband was not enough for both home consumption and further processing. As it was indicated by one of the women processors in Nanjota WCPG Masasi District:

"In the past I had not enough RCN for processing, but now I own a farm of two acres of which gives me enough cashew for processing in the group and for home consumption."

Women's access to use of income from the sale of raw cashew and processed cashew

Control over income after selling raw cashew through AMCOS is dependent on cashew farm ownership. The majority of male-headed households from the study area undertake cultivation together with their spouse. However, men tend to control income from the sale of raw cashew nut because of their status as farm owner and its income bulkiness. One male producer from Makote AMCOS indicated that:" Most *of men manage raw nut cashew income compared to processed cashew."*

In 2020, raw cashew in Mtwara District earned an average price of TZS 2,200-2,800 per kg while processed cashew earned TZS 18,000 – 27,000 per kg depending on the product (white, brown, or roasted cashew). Men tend to sell raw cashew to AMCOS with the benefit of market assurance and receive the income in bulk. Although processed cashew earns a higher price than raw cashew nut, male producers in Newala and Masasi Districts described the benefit of selling raw cashew in bulk rather than selling processed cashew:

> *"I earn about 2 million by selling 800 kilos to AMCOS that helps me make my living" (Source: Male producer, Machi AMCOS, Newala District)*

> *"….I am discouraged to participate in processing activities mainly because of the time burden with processing and market assurance of selling processed cashew …." (Source: Male producer, Ebunuone AMCOS, Masasi District)*

Men also do not participate in processing activities because as one male producer from Boma AMCOS explained, *"cashew processing is women's work."* Therefore, women control cashew processing activities and income from the sale of processed cashew.

The findings also indicate that some dual-headed households normally discuss and agree on the use of income from the sale of raw cashew nut. Thereafter, women are in charge of decisions on household food and non-food items. One female producer reported that decisions to allocate income from raw cashew tend to be discussed together with her husband:

> *"After selling raw cashew through AMCOS, my husband normally brings the money back home and we decide on how to spend it" (Source; Female producer, Newala district, Mtwara).*

However, men also use the money obtained from the sale of raw cashew for personal expenses, such as settling debt and marrying another wife.

> *"I use most of the money caring for the family basic needs, such as food and health care, while my husband is ignoring his responsibilities" (Source: Female Individual processor, Newala District, Mtwara).*

Women have relative control over income from the sale of processed cashew. and they have more freedom to spend the income they earn on minor household expenditures. However, they need to consult with their spouse when purchasing larger assets, such as farmland or household improvements. Purchasing these assets without consultation may lead to household conflict as reported by one woman in Mtwara:

> *"If I start renovating the house, my husband will ask where I got the money from. Investing in the household or purchasing large assets requires prior approval of husbands." (Source; female processor, Masasi district, Mtwara).*

The commercialization of cashew was seen as creating a major change, resulting in increasing revenue gained from agriculture and many farmers switched to cashew cultivation from other farming activities. For men, the major source of income prior to cultivating cashew was from cultivation of food crops, such as cassava, maize, millet, and sorghum. Men also derived income

from fishing and rearing of livestock. For women, prior to cultivating cashew, their other sources of income come from cultivation of groundnut, sorghum, and cowpeas.

Women's Engagement in Cashew Processing—opportunities and constraints

Policy reform relevant for WCPG access to raw cashew

Prior to 2020, raw cashew produced in Tanzania could only legally be sold through a government-run auction, and until very recently, buyers at the auction were obligated to export either the raw cashew or the processed raw kernels. This significantly limited access to raw cashews for local processors, particularly WCPGs. In response to stakeholder requests for policy change, in August 2020, the GoT amended cashew nut marketing and sales regulations to enable domestic cashew processors to acquire sufficient quantities of raw cashew for domestic processing for domestic or export market. According to the guideline provided, only local processors are allowed to take advantage of this opportunity to buy raw cashew nuts at the primary markets, for a quantity that depends on their annual processing capacity.

The amendment allows small-scale processors to procure up to a maximum of 50 tonnes in the auction. It also waives the requirement for a money deposit as procurement bid security and instead requires a bank guarantee. The minimum deposit of 20 million for 50-100 tons of cashew was unaffordable for many small-scale domestic processors. However, while the new requirement to submit a bank guarantee reduces the constraints to obtaining larger volumes of raw cashew, it remains difficult for some small processors to receive a bank guarantee because WCPGs typically operate outside of the formal banking system. Though WCPGs have bank accounts–as one of their registration requirements–their daily transactions usually do not go through banks for many reasons, including insufficient understanding of the banking system and the importance of business record keeping. Yet, because this policy change also allows local processors to legally source larger volumes of cashew from Agricultural Marketing Cooperatives (AMCOs), this provides an important opportunity for WCPGs – assuming they can finance it – to additional quantities of RCN.

The processors must use the following procedures in order to buy cashew from the primary markets; a) A local processor should apply online to get a buying license from the Ministry of Agriculture through agricultural trade management information system. The online form requires a local processor to identify his/her processing capacity in a year. b) CBT shall review each processor's applications to confirm their processing capacity in a year and inform relevant district officials where purchase will be made for the purpose of overseeing and managing the sales information. Despite all the efforts made to address the processors' challenge in accessing raw cashew for processing, still there is a need to bring awareness to all processors about the guideline.

Limited access to modern processing equipment

Lack of access to improved small-scale mechanical processing equipment is one of the main constraints facing WCPGs. The equipment typically used for small-scale or "cottage" cashew processing activities, such as boiling, breaking the nut, drying, and shelling, are manual or semi-

manual[6] technologies. This results in such processing being highly labor-intensive and tedious with low productivity. For example, one cracker cutting shelling machine costs $140 and involves more labour depending on the number of machines available. Another challenge with highly labor-intensive processing equipment is that they often produce broken pieces of cashew, which have limited market value (Mutayoba, 2018). According to Mutayoba (2018), the low productivity and relatively poor quality of output from this rudimentary processing method results in WCPGs that are not very competitive in the domestic market for processed cashew on both cost and quality.

> *"In fact, lack of equipment makes production less and less efficient. For example, you can peel cashews and you find that you are not able to arrange them according to quality due to the lack of equipment to separate the whole cashew nuts from broken cashew nuts." (Source; Nangwala Treatment FGD in Newala district, Mtwara)*

Health/safety hazards given limited protective equipment

Cashew processing involves safety and health hazards due to a lack of protective gear. For example, women typically use their bare hands to peel and handle raw cashew nut, which can result in burns from toxins in the shells. Cashew nutshell liquid (CNSL) contains *dermatogenic phenolic resin, urushiol,* a strong skin irritant and toxin that can be dangerous if it comes in contact with the skin or eyes. Women processors in FGDs mentioned that:

> *"Sometimes if you don't wear gloves, resin may damage your hands and can also damage your eyes. Also, steam and smoke with strong odor can result in respiratory problems. Most girls are not willing to participate in processing activities, fearing the damage to their hands would cause them to be rejected by their husbands or husbands-to-be." (Source; Kipimi FGD in Newala district)*

Challenges in marketing processed cashew

Most cottage-processed cashew nuts are not sold by WCPGs to specialized markets but rather to local retailers, such as shops, supermarkets, and street vendors which often include women from WCPGs. WCPGs also sell processed cashew nuts to large traders, including businessmen from Dar es Salaam.

> *"We do not have special places to sell. We sell by walking around the shops and markets. Sometimes the group takes processed cashew to Nachingwea, Lindi town, or Dar es Salaam city after receiving customers' orders who have been informed by SIDO or other members of the community that we have processed cashews for sale." (Source, FGD, Masasi district, Lindi)*

Most cottage processors maintain relationships with traders from different parts of Tanzania. These traders communicate with customers and share with them real time market information on the availability of cashew nuts for sale. Sometimes traders travel to Lindi and Mtwara regions to source processed cashew nuts directly from cottage processing groups.

Most WCPGs reported significant challenges in marketing their processed cashew via sales agents in Dar es Salaam, which is the largest and closest market. Women's mobility restrictions due to cultural norms pose a challenge in sale arrangements by preventing them from travelling to Dar es Salaam to

[6] Semi-manual machine assists in de-shelling while peeling is done manually.

sell their products directly. Rather, WCPGs usually rely on sales agents to arrange the sale and pay the WCPG a pre-agreed share of the net revenue. However, most WCPGs reported that such agents either failed to pay them what was agreed and/or the payments were significantly delayed. In some cases, the agents may be unable to find a buyer and they return the cashew to the group, by which time the quality and, thus, value of the cashew has diminished considerably. In some cases, they never see the agent again and receive no return at all for their cashew. There are various reasons why this may occur.

First, sales agents typically do not have sufficient capital or credit to give women a partial payment upon receipt of the processed cashew. Thus, a typical agreement between the WCPGs and agent is that women are only paid if and when the agent is able to sell the cashew and then return to their ward (many weeks later). As indicated by female processors from Nanjota WCPG that *"we are usually fully paid after the buyer has successfully sale processed cashew."*

Second, WCPGs usually do not have sufficient experience and/or knowledge to enter into an effective, written, legal contract with an agent, or to enforce such contracts. WCPGs indicate that *"we normally trust each other through a word of mouth" (Source: Kipimi WCPG, Nachingwea, Lindi*). Contract enforcement is a significant challenge not just for rural women, but for both male and female small-scale entrepreneurs in the farm and non-farm economy throughout the country. Third, most agents are not from the same ward as the WCPG, so women processors do not know about the effectiveness and integrity of a given agent, unless they have worked with the agent before or have reliable information about the agent from other groups.

Thus, if the only agents available at a given point in time are not known by the group, the women will likely have limited power to enforce their agreement (i.e. restrain the agent from dishonest behavior). While the GoT has a policy that governs the marketing of raw cashew as well as enforcement mechanisms, there is no GoT policy governing the marketing of domestically processed cashew.

> *"We often send them to our agent due to lack of markets which made it impossible for us to set prices for our cashew. This has also led to payment delays, sometimes after a month, and hence becomes a marketing challenge." (Source; Tumaini FGD in Newala district)*

V. Assessment of SIDO intervention in women's cashew processing

Introduction

This section presents results of the assessment of the SIDO intervention in women's cashew processing, which is described in section 2.3. This part of the paper relies primarily on quantitative estimates of the costs, productivity, sale prices, and profitability of WCPGs in the 3 districts of Mtwara and Lindi in which the study team did field work. Methods, assumptions, and caveats for the following analysis are discussed in section 3.

WCPG productivity in processing RCN

Most of the WCPGs that received improved small-scale cashew processing equipment and training reported (qualitatively) that the equipment improved both their productivity and the quality of their processed cashew. Analysis of the productivity-related figures provided by leaders of WCPGs indicates that the treatment groups in all districts experienced an increase in the productivity of processing RCN as compared with estimates of their own productivity prior to using the improved equipment and with the average productivity of the control group at the time of the field work.

The labour time saved by the mechanized sheller (and other equipment) enables treatment groups to process about six 80 kg bags of RCN per day (with 5 women) as compared with two 80 kg bags of RCN per day (5 women) (Table 2). Thus, treatment groups can process 3 times as much RCN per day. The mechanical sheller also enables the treatment groups to obtain an increased quantity of white kernels per 80 kg of RCN (19 kgs of white kernels) compared with quantity of white kernels they obtained prior to the intervention (15 kg per 80 kg of RCN). Thus, the productivity gains from the mechanized sheller enable treatment groups to produce about 114 kg of white kernels per day compared with 30 kg by the control groups. This means that the improved equipment enabled a group of 5 women to produce 3.8 times as much white kernels per day compared with control groups, which use traditional, rudimentary processing tools.

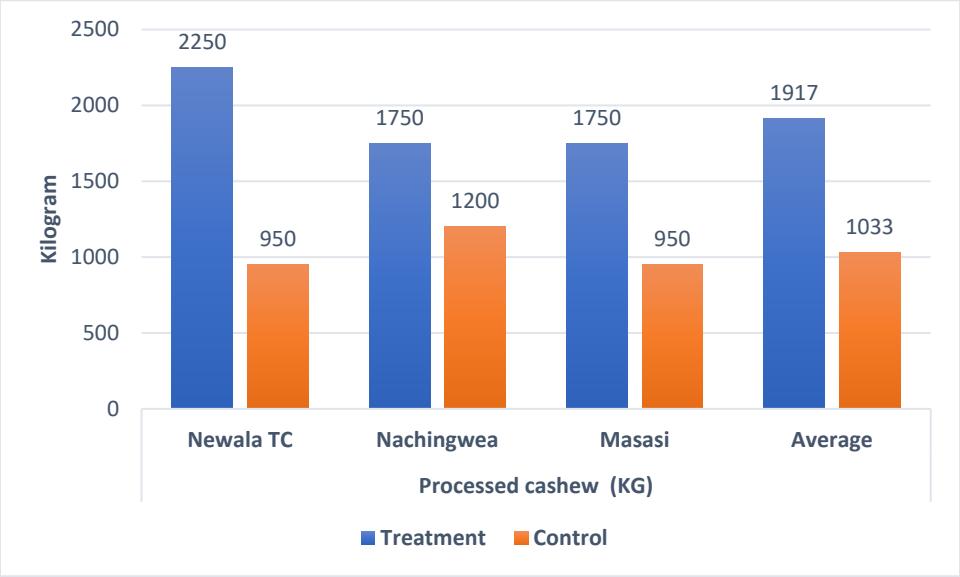
Table 2. Productivity of processing RCN for WCPGs for treatment and control groups, 2021

	Treatment	Control	% difference[1]	T / C ratio
Productivity				
Whole white kernels (kg) per 80 kg RCN	19	15	27	1.27
80 kg RCN Bags processed/day (with 5 women)	6	2	200	3.00
Whole white kernels produced per day	114	30	280	3.80

Source: Authors' computations from WCPG data.

The labor productivity gains enjoyed by treatment groups enabled them to process as much as double the volume of RCN per season as control groups. For example, in Newala TC, treatment groups were able to process an average of 2,250 80 kg bags of RCN that season, compared with an average of 950 80 kg bags of RCN for control groups (Figure 3).

Figure 3. Volumes of cashew nut processed by treatment and control groups by district



Source: Team field work

On average, the treatment group can process 1,917 kg per season while the control group can process 1,033kg. The Control group produces a maximum of one tonne per year due to several challenges including poor processing equipment and capital for purchase of raw nuts:

> *"We are facing challenges with our processing equipment and raw nuts for processing…. At the moment we are producing an average of 950kg per year which is not enough to benefit the whole group" (Source: WCPG, Chungutu Masasi District).*

In contrast, most WCPGs in the treatment group[7] reported that they were able to increase productivity and quality. In Luchigu, Women Focus Group participants mentioned that;

> *"Before given the cracking machine, we used to produce maximum of 1 ton per year, but after receiving the machine we can produce from 2 to 4 tons per year".*

Another group in Lindi Region stated that:

> *"We used to use an iron bar as a tool for cracking the nuts and this took us a lot of time …after being facilitated with the equipment we can now process 55kg per day"(Source: Nachingwea, WCPG Nachingwea District).*

Despite an increase in productivity, the total seasonal quantities processed by the treatment groups were less than "*the capacity of the improved processing equipment which is 25 to 27 tons per year*" (Source: SIDO manager, Mtwara District). This discrepancy is due to persistent challenges in sourcing

[7] *Treatment group are the women cashew processing group who received processing machines from SIDO*

enough raw cashew and difficulties in selling adequate quantities of processed cashew at a good price. Inadequate raw cashew for processing has necessitated both treatment and control groups to set a requirement for each member to contribute to its group a minimum of 20kgs raw cashew nut from their farm for processing. However, it is always not enough for a group to depend on RCN from group members for processing, which is why treatment groups source RCN both members and non-members.

Unit price of processed white cashew kernels

The treatment groups' equipment and training on it also enables them to produce a somewhat higher quality kernel, which obtains a price/kg that is about 5 percent higher than that of control groups. As noted above, because WCPGs face significant constraints to obtaining formal credit, they report that they often are not able to process as much RCN each season as they would like to as they are only able to self-finance (and self-provide) a limited aggregate quantity of RCN for processing each season. However, because the treatment groups were able to process RCN 3 times as quickly, to produce about 3.8 times as many white kernels per day, and obtain a 5 percent higher price for them, they reported that they were able to process and sell their initial RCN inputs in time to self-finance more additional RCN than they could prior to the intervention. WCPGs also noted that earning sales income more quickly during the beginning of the season enabled them to hire additional labor within and outside the group and sometimes purchase additional processing equipment.

In fact, control groups said that they would like to have processed more RCN that season but were constrained by both lack of credit and inability to self-finance additional RCN inputs. This helps to explain why the treatment groups were able to produce an average of 1,917 kg of white kernels per season, which is about 85 percent more than the average of 1,033 kg per season by control groups (Table 4). When these productivity and price benefits are combined across a season, treatment groups' annual gross revenue is nearly double that of control groups.

Table 3. Seasonal gross revenue of WCPGs for treatment and control groups, 2021

	Treatment	Control	% difference[1]	T / C ratio
Gross Revenue				
Seasonal production of processed cashew (kg)	1,917	1,033	85	1.85
Price / kg of processed cashew (Tsh/kg)	21,417	20,417	5	1.05
Gross Revenue (season)	41,048,611	21,097,222	95	1.95

Source: Authors' computations from WCPG data.

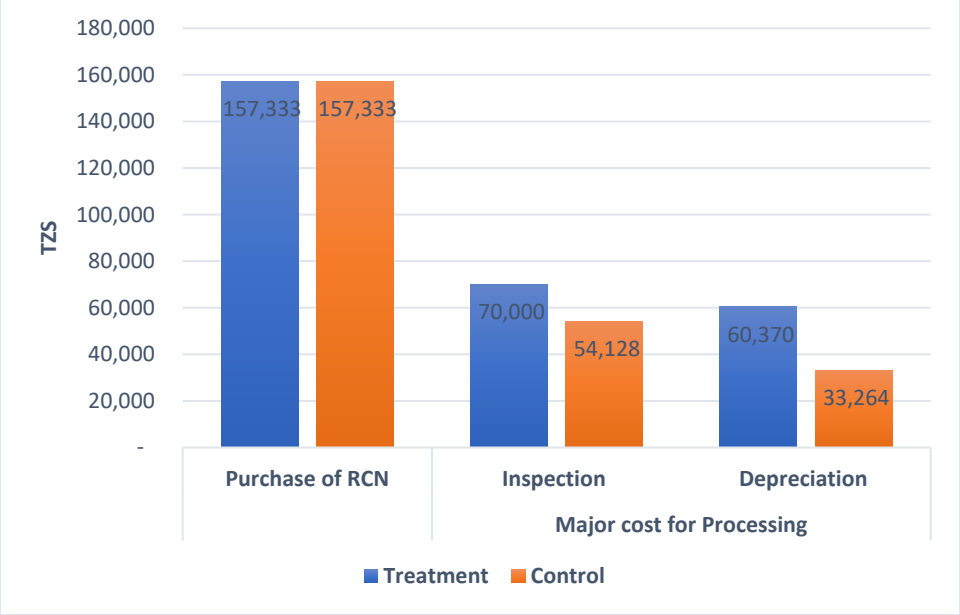
Processing costs

The costs of processing RCN include both fixed and variable costs (operation costs). Fixed costs include the cost to purchase the improved processing equipment, maintenance costs and fees for equipment repair and an annual building inspection. Although the treatment groups received mechanized shellers for free from SIDO, to provide a more appropriate profitability comparison with control groups, we construct treatment groups' fixed costs from data they reported as though

they had paid the full price of the shellers. Variable costs include purchase of raw cashew, transport of raw and processed cashew[8], packaging facilities, utilities (firewood/charcoal, water, electricity) and labor for peeling, boiling, and cooling of cashew.

The most significant cost each season for WCPGs is the cost of purchasing RCN, followed by an inspection fee and depreciation value of both buildings and machinery. Both treatment and control groups incur the same purchasing RCN cost of 157,333 TZS per 80kg bag of RCN (Figure 4), as they use the same source. The groups usually procure RCN from farmers at an average price of 2,000 TZS per kg.

Figure 4. Major cost items in total costs of processing RCN



Source: Team field work

Treatment groups have higher average (358,000) depreciation costs per year on the value of fixed assets such as buildings and processing equipment per year relative to that of control groups (197,000). The reason is that treatment groups own more valuable processing equipment and higher quality buildings. For example, the majority of control groups do not own a processing building/processing cottage but rather use a shade house or leader's house which they used for processing operations. Most WCPG that own a cottage own two to three cracking machines, while

[8] Transportation costs range between TZS 2,000 to TZS 6,000 per bag of 80kg depending on where a group sources RCN for processing; some groups purchase RCN within the wards while others are able to source more from group members who grow cashew. Transportation costs associated with retailing/selling processed cashew are between 2,000-10,000 TZS in both treatment and control groups, though vary depending on the sales agent, quantity produced, or retention of previously accessed markets. Groups which sell in big towns/ districts such as Mtwara town, Tandahimba and Dar es salaam use public passenger buses as means of transport. They are normally charged TZS 10,000 to transport any amount of processed cashew to town. This might indicate that there is high variation in volumes of processed cashew that if a unit price is set it will not benefit the passenger bus drivers thus the reluctance of passenger bus transport to restrict on unit price. However, this is not the case with others means of transport, as motorcycles (Boda boda) they normally charge in regard to distance and quantity.

treatment groups may own more than 4 cracking machines. Treatment groups also pay more on average in inspection fees to OSHA (annual building and working conditions inspection fee) due to their higher quality buildings and equipment.

Treatment groups incur about 62 percent higher fixed costs per year relative to control groups, due primarily to the fixed costs associated with purchase of the improved equipment by treatment groups. Yet, the fixed costs of depreciation per season of equipment and a building are actually quite small compared to total variable costs per season – which are quite similar between treatment and control groups. Though treatment groups' total costs per season are about 36 percent higher than those of control groups, the productivity and value gains from the improved processing equipment enable treatment groups to enjoy profits that are 3 times higher per season relative to those of control groups.

Profitability

Total net revenue (i.e. earnings or income) from processing raw cashew and then marketing it is defined as the gross revenue from sales minus the fixed and variable input costs incurred by a WCPG. Though treatment groups' total costs per season are about 36 percent higher than those of control groups, the productivity and value gains from the improved processing equipment enable treatment groups to enjoy profits that are 3 times higher per season as those of control groups (Table 4).

Table 4. WCPG productivity, gross revenue, costs, and total season profits of treatment and control groups, 2021

	Treatment	Control	% difference[1]	T / C ratio
Productivity				
Whole white kernels (kg) per 80 kg RCN	19	15	27	1.27
80 kg RCN Bags processed/day (with 5 women)	6	2	200	3.00
Whole white kernels produced per day	114	30	280	3.80
Gross Revenue				
Seasonal production of processed cashew (kg)	1,917	1,033	85	1.85
Price / kg of processed cashew (Tsh/kg)	21,417	20,417	5	1.05
Gross Revenue (season)	41,048,611	21,097,222	95	1.95
Costs (Tsh)				
Variable costs of processing one 80 kg bag of RCN	181,833	185,617	(2)	0.98
Fixed costs (season)	431,333	266,294	62	1.62
Variable + Fixed costs (season)	18,975,343	13,906,611	36	1.36
Total Season Profit (Tsh)	22,073,268	7,190,611	207	3.07

Source: Authors' computations from WCPG data.

Sale prices by extent of processing and challenges in marketing processed cashew

Most of the processed cashews are sold in retail from around the centers, markets and even across the regions. The SIDO intervention has enabled WCPGs to process raw cashew into three types: white, brown, and roasted. Among these, white cashew is seen to be more processed than other cashew products. These cashew products are priced at a higher level than raw cashew. For example, most participants from the focus group discussion mentioned that the average price for raw cashew is Tsh 2,000 per kg. For the typical products produced by WCPGs sell for an average of Tsh 20,000 per kg for white cashew, Tsh 21,000 per kg for brown cashew while the roasted products sell for 30,000 and 25,000 per kg, respectively. Most non-beneficiaries were not aware of other products besides white and brown cashew.

> *"We do not know if there is another product other than the cashew itself" (Source: Mijelejele Control FGD, Masasi District, Mtwara)*

Beneficiary WCPGs receive training in marketing and receive better access to market information and credit, in addition to the training on the use of processing equipment.

Apart from training and machinery, the intervention also provided market information to help the beneficiary WCPGs to identify markets for their processed cashew. A SIDO Officer in Mtwara explained:

> *"In addition to training and machinery, SIDO has a marketing information unit that helps cashew processors identify markets and provide traders with information on the availability of processed cashew." (Source; SIDO officer, Mtwara*)

Other marketing challenges relate to the perishability of processed cashew. Given the relatively short shelf life[9] of processed cashew, WCPGs are eager to sell products in a timely fashion to avoid deterioration of quality and are sometimes willing to accept lower prices. Both treatment and control WCPGs discussed the issue of having to sell cashew products to agents on credit. Treatment WCPGs reported having good relationships with recurring buyers. However, they faced the same challenges related to delayed payments or no payments from some of their customers.

Problems with group formation and the SIDO selection process

In addition to the above-mentioned challenges, some beneficiary WCPGs were ineffective because of their inability to manage intra-group conflicts. As a result, after receiving the free equipment and training, some beneficiary WCPGs were unable to use it and some even disbanded the group. It appears that such groups lacked sufficient trust among members, mutual interest in the group's objectives, and adequate experience in collective decision-making and conflict resolution. Groups

[9] Shelf life is the length of time for which an item remains fit for consumption i.e. sellable.

with these challenges tended to have little to no experience working together prior to the group's formation, suggesting that the targeted groups were, in fact, not the most "active" despite being defined as such by SIDO. Some of the beneficiary WCPGs had only recently formed in response to SIDO and/or local politicians publicizing the intervention, which was only available for "active" WCPGs. Thus, a number of groups formed quickly on their own or at the request of community leaders.

> *"Most groups are formed based on political events. For example, during the election campaigns, campaigners would promote group formulation for political reasons. These groups normally dissolve or become dormant after the election." (Source: SIDO)*

The selection of inexperienced groups to receive the intervention was also due to SIDO's lack of engagement with potential groups during the selection stage to assess the expectations and objectives of group members and their prior experience working together. Moreover, SIDO did not provide groups with training aimed at facilitating group interaction, which could have been implemented following group selection or as part of the selection process. Engaging in a longer and more in-depth group evaluation and selection process, as well as providing training on effective group interaction which would require a larger budget and time investment by SIDO and/or greater partnership with international and local NGOs that have developed best practices for group formation and support.

VI. CONCLUSIONS & RECOMMENDATIONS

The GoT has identified the cashew nut value chain as having great potential to help semi-subsistence farm households shift into more commercial and profitable agricultural activities as well as to support women's economic empowerment. This has led the GoT and development partners to implement several programs in recent years to increase women's engagement in the cashew value chain. However, very little research exists to inform the choice and design of current and future programs, and no study to date has assessed a particular intervention that has provided improved small-scale cashew processing equipment to selected women's cashew processing groups. This study addresses this knowledge gap through analysis of qualitative and quantitative data gathered by the authors in Tanzania's two main cashew production regions, Mtwara and Lindi. The authors conducted interviews and focus group discussions with key actors along the cashew value chain, including smallholder cashew producers and women's cashew processing groups. The study results highlight that many challenges remain to increasing women's participation in and benefits from engagement in the cashew value chain in Tanzania. The following are the study's key findings.

Nature of gendered roles in the Tanzania cashew value chain

Distribution of gender roles: There is a strong gendered pattern of participation in cashew production whereby men are primarily involved in tasks such as pruning, applying fertilizers and pesticides, and transporting cashew from the field, while women are primarily involved in tasks that are considered physically lighter (by male and female respondents), such as weeding, but which are, in reality, very tedious, strenuous, and time consuming.

Women's participation in decision making in the household: There is also a gendered pattern in intra-household decision making authority that varies by source of income, type of expenditure, and farming activity. In general, while women may be consulted in decisions, men often make the final decision. Women are usually allocated a certain share of the proceeds from the sale of raw cashew for the purchase of basic household items, such as food, yet they have limited autonomy to make larger purchases.

Access to financial services: Registered and un-registered local savings groups (SACCOS) are the main source of loans for women as they are relatively easy for women to access and do not require collateral. Women mainly use credit to fund household food and other expenditures, while men have greater access to larger loans to support business investments.

Choice of market channels: There are limited options for the sale of raw cashew nuts, although a recent GoT amendment to cashew marketing and sales regulations is intended to enable more options. Women's marketing options for processed cashew are generally limited to unspecialized domestic markets, such as street vendors, shops, and local supermarkets.

Improved small-scale cashew processing equipment and training enables WCPGs to dramatically increase their productivity and profitability

Most of the WCPGs that received improved small-scale cashew processing equipment and training reported that the equipment improved their productivity and the quality of their processed cashew. The findings indicate that groups using this equipment can process 3 times as much RCN per day compared with the quantity that they could process before using rudimentary shelling tools. The equipment also enables the treatment groups to obtain about 27 percent more whole white kernels per 80-kg bag of RCN relative to control groups and earn a market price per kilogram of the kernels are about 5 percent higher due to better quality.

Because WCPGs face significant constraints to obtaining formal credit, they report that they often are not able to process as much RCN each season as they would like to as they have limited access to formal credit and are not able to self-finance and self-provide more than an initial aggregate quantity of RCN for processing each season. However, treatment groups were able to take advantage of their significant gains in processing amounts per day by using sales income from their initial stores of RCN input to relieve this credit constraint by self-financing one or more additional tranches of RCN to process during the same season. Subsequently, treatment groups were able to produce about 85 percent more processed cashew per season control groups. This enabled treatment groups to earn almost double the gross revenue per season of control groups and enjoy profits that were 3 times higher.

Continuing constraints for women's empowerment in cashew processing

Despite the success of this intervention for some of the participating WCPGs, the groups and their individuals continue to face various constraints that limit their ability to participate in small-scale cashew processing and to increase the productivity, sales, and profitability of existing groups. First, Tanzanian women continue to face constraints from predominant sociocultural beliefs and customs that result in women having limited control over key household resources, lack of confidence and self-esteem, and limited ability to assert themselves in intra-household decision-making processes. Such constraints also lead to societal assumptions that women do not have sufficiently strong bargaining power and leadership skills needed to engage in more remunerative and market-oriented activities.

Second, accessing raw cashew remains a challenge for women because of their limited access to formal credit and inability to self-finance this input. Despite a recent policy reform by the GoT intended to make it easier for small-scale processors to procure relatively small amounts of raw cashew through an auction or directly from AMCOs, accessing raw cashew remains a challenge for WCPGs. This suggests a need for future research into how the new regulation and its implementation has helped or not to improve WCPGs access to raw cashew.

Third, reliance on sales agents is a major problem for most WCPGs and can result in significant financial losses. Cultural factors limiting women's travel and women's relative inexperience lead most WCPGs to sell their processed cashew through a sales agent. However, the agents typically need to transport their cashew to Dar es Salaam to find a buyer and do not provide a partial payment upfront. Often agents fail to pay what was agreed, payments are significantly delayed and occasionally never made. The challenge is due to a general lack of effective contract enforcement combined with the groups' inability to rely upon social pressure to enforce the agreement, as may be possible if the agent is from their ward. While GoT has a policy that governs the marketing of raw cashew as well as enforcement mechanisms, to our knowledge, there is no GoT policy governing the marketing of domestically processed cashew. The lessons learned from the regulation of raw cashew sales could be applied to the sale of processed cashew (domestically).

One alternative used by a few WCPGs is for the women to include some young men as members, as men have a comparative advantage in both sourcing inputs (raw cashew) and marketing processed cashew. For example, for cultural reasons, it is easier for men to travel repeatedly outside the village or ward as well as to negotiate the purchase of inputs and sale of cashew (usually with other men). men. Women prefer to work with younger rather than older men, because they say that once men reach a certain age, such men often assume that they should be leading the group and can then become difficult to work with. By contrast, the group is able to make joint decisions more easily with younger men. This finding has an implication for the SIDO intervention, as it only allows WCPGs that consist only of women to participate in the program.

Need for improvement in SIDO group formation and selection process

While the SIDO intervention was quite successful for many participating WCPGs, some groups received processing equipment were never able to take advantage of the potential benefits of the improved equipment because they could not effectively work as a group. That is, they were unable to manage intra-group decision making and disagreements, leading some to stop using the equipment entirely or even disband the group. These groups appear to have lacked trust (social capital and cohesion), experience working together, and common interests and incentives needed to work together. A main reason for this is that it appears that some of the WCPGs selected by SIDO to receive the program benefits had been recently formed in response to SIDO and/or local politicians publicizing the opportunity (to receive free processing equipment), which could only be accessed by a WCPG.

Second, SIDO's selection process did not sufficiently engage with groups under consideration to assess the expectations and objectives of group members and their prior experience working together in a group setting. Third, it appears that SIDO did not provide prospective or selected groups with training aimed at facilitating group interaction and building decision-making and conflict-resolution skills. These results imply that SIDO should consider engaging in a longer and more in-depth group evaluation and selection process, so as to improve their ability to select groups for their intervention with characteristics more consistent with effective group interaction.

Additional implications for policy and program design: Another opportunity that SIDO or related interventions could consider is training for WCPGs on technical skills to improve the quality of their processed cashew as well as various skills needed for effective market identification and sales negotiation. Other interventions that could provide facilitate WCPG cashew marketing could include more general efforts by the GoT to improve contract enforcement for small- and medium-scale farm and non-farm entrepreneurs; GoT institution of a license for purchasing processed cashew, to help protect WCPGs from disingenuous sales agents; and facilitation of linkages between WCPGs and buyers in large cities such as Dar es Salaam. In order for SIDO to achieve its goals of improving the efficiency of cottage processing industry and the incomes earned by WCPG members, it should consider ways to reduce the marketing constraints and facilitate sales of processed cashews by WCPGs. This may be done through an additional component to the existing program, a separate SIDO program, or better coordination with separate GoT or other programs.

Future research: This suggests the need for future research into how the new regulation and its implementation has helped or not helped to improve WCPGs access to raw cashew. This constraint also highlights the need for SIDO and GoT policymakers to: (a) have access to (and to recognize the need to request) empirical evidence on the various constraints and opportunities to women's empowerment in small-scale cashew processing (and any higher-return farm or non-farm activities, for women or men); and (b) to design and implement a set of programs, investments and policies that can concurrently address those constraints, such that WCPGs can take advantage of opportunities to improve their incomes. For example, while productivity gains from a group's access to improved small-scale processing equipment should enable them to increase production, the group cannot do that without improved access to raw cashew. Likewise, the benefits a group receives from gains in their productivity (and possible production levels) will only be realized if the group manages to sell their processed cashew at a reasonable price (as discussed more below).

Future research could engage in *ex ante* economic benefit-cost analysis to assess whether the additional expenditure needed to improve the selection process and technical support for training on group effectiveness would improve the program's effectiveness as well as its expected rate of return as compared with the status quo situation.

III. References

African Cashew Alliance. 2021. "Government committed to supporting cashew processing: CBT Director." Posted on 9 Nov 2021 on https://www.africancashewalliance.com/en/news-and-info/blog/government-committed-supporting-cashew-processing-cbt-director

Ahmend, M.S. & W. Jinaguo. 2014. "Financial Inclusion and Challenges in Tanzania." *Research Journal of Accountancy* 5(21): 4-5.

Alene, A.D., V.M. Manyong, G.O. Omanya, H.D. Mignouna, M. Bokanga, and G.D. Odhiambo. 2008. "Economic efficiency and supply response of women as farm managers: Comparative evidence from Western Kenya." *World Development,* 36(7):1247-1260.

Andersson-Djurfeldt, A. 2018. Gender and Rural Livelihoods: Agricultural Commercialization and Farm/Non-Farm Diversification. In *Agriculture, Diversification, and Gender in Rural Africa: Longitudinal Perspectives from Six Countries*. Agnes Andersson-Djurfeldt, Fred Mawunyo Dzanku, and Aida C. Isinika (Eds.) Oxford University Press.

ANSAF. 2022. "Economic opportunities in cashew processing and the costs of exporting raw cashew nuts." Unpublished report cited by Agricultural Non-State Actor Forum (ANSAF), Dar es Salaam. Cited by news article in *The Citizen*, "How Tanzania loses billions in raw cashews exports" by M. Jumbe, on 20 Feb 2022.

Azam-Ali, S. H., & E.C. Judge. 2001. Small-scale cashew nut processing. Coventry (UK): ITDG Schumacher Centre for Technology and Development Bourton on Dunsmore.

Badstue, L., Farnworth, C. R., Umantseva, A., Kamanzi, A., & L. Roeven. 2021. "Continuity and change: Performing gender in rural Tanzania." *The Journal of Development Studies*, *57*(2): 310-325.

Barrett, C.B. 2008. "Smallholder market participation: Concepts and evidence from eastern and southern Africa." *Food Policy* 33:299–317.

Brown, C.K. 1994. Gender Roles in Household Allocation of Resources and Decision Making in Ghana. Family and Development Programme (FADEP), Department of Geography and Resource Development, University of Ghana, Legon, Ghana.

Budlender, D. 2008. The statistical evidence on care and non-care work across six countries. Geneva: United Nations Research Institute for Social Development (UNRISD).

Coles, C. & Mitchell, J. 2011. "Gender and agricultural value chains. A review of current knowledge and practice and their policy implications." ESA Working Paper No. 11-05. Food and Agriculture Organization, Agricultural Development Economics Division (ESA): Rome.

Dolan, C.S. 2001. "The 'Good Wife': Struggles over Resources in the Kenyan Horticulture Sector." *Journal of Development Studies*, Vol. 37(3): 39-70.

Duflo, E. and C. Udry. 2004. "Intrahousehold Resource Allocation in Cote d'Ivoire: Social Norms, Separate Accounts and Consumption Choices." NBER Technical report 10498. National Bureau of Economic Research, Cambridge, MA, USA.
Ellis, A., M. Blackden, J. Cutura, F. MacCulloch & H. Seebens. 2007. *Gender and economic growth in Tanzania: Creating opportunities for women*. World Bank: Washington, D.C.
Fan, S., ed. 2008. Public expenditures, growth, and poverty: Lessons from developing countries. Baltimore, MD, Johns Hopkins University Press.
Fischer, E., and M. Qaim. 2012. "Gender, agricultural commercialization, and collective action in Kenya." *Food Security*, 4: 441-453.
Fitzpatrick, J. 2013. "Advocating for effective regulation of the cashew nut industry in Tanzania." ANSAF, Dar es Salaam.
GIZ. 2013. *Gender and Value Chains*. Bonn, Germany: Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH.
Haggblade, S. and Hazell, P., 1989. "Agricultural technology and farm-nonfarm growth linkages." *Agricultural Economics* 3: 345-364.
Haggblade, S., P.B.R. Hazell, & T. Reardon (eds). 2007. Transforming the rural nonfarm economy: opportunities and threats in the developing world. IFPRI and The Johns Hopkins University Press.
Hoddinott, J., & L. Haddad. 1995. "Does female income share influence household expenditures? Evidence from Côte D'Ivoire." *Oxford Bulletin of Economics and Statistics*, 57(1): 77–96.
Huyer, S. 2016. Closing the gender gap in agriculture.
IFAD. 2016. Rural Development Report 2016: Fostering inclusive rural transformation. International Fund for Agricultural Development (IFAD): Rome, Italy.
IPPMEDIA, 2014. "SIDO invents new smallscale cashew shelling machines." Online article available at: http://www.123tanzania.com/?module=news&action=newsdetails&news=5553
Johnston, B.F., and J.W. Mellor. 1961. The role of agriculture in economic development. *American Economic Review* (51): 566–593.
Kabeer, N. 1999. "Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment." *Development and Change* (30): 435- 464
Kaplinsky, R. and Morris, M. 2001. A Handbook for Value Chain Analysis. Ottawa: International Development Research Centre *Kenton, Will.* "Value Chain". *Investopedia*. Retrieved 2019-02-20.
Kassie, M., J. Stage, H. Teklewold, & O. Erenstein. 2015. "Gendered food security in rural Malawi: Why is women's food security status lower?" *Food Security* 7:1299-1320. https://doi.org/10.1007/s12571-015-0517-y
Kaplinsky, R. and M. Morris. 2000. A handbook for value chain research. Ottawa, Canada: IDRC
Kes, A. & H. Swaminathan. 2006. "Gender and Time Poverty in Sub-Saharan Africa." Chapter 2 in Blackden, C.M. and Q. Wodon. (Eds.). Gender, Time Use, and Poverty in Sub-Saharan Africa. World Bank Working Paper No. 73, The World Bank, Washington, D.C.

Kilama, Blandina. 2013. The diverging South: Comparing the cashew sectors of Tanzania and Vietnam. African Studies Collection, vol. 48, African Studies Centre, Leiden, The Netherlands.

Laven, A., A. van Eerdewijk, A. Senders, C. van Wees & R. Snelder. 2009. "Gender in Value Chains. Emerging Lessons and Questions." Draft working paper, AgriProFocus, Netherlands.

Masamha, B., V. Thebe, V. N. E. Uzokwe, 2018. "Mapping cassava food value chains in Tanzania's smallholder farming sector: The implications of intra-household gender dynamics." *Journal of Rural Studies*, 58: 82-92. https://doi.org/10.1016/j.jrurstud.2017.12.011.

Mbasa, W.V., W.A. Nene, F.A. Kapinga, S.A. Lilai, & D.D. Tibuhwa. 2021. "Characterization and chemical management of Cashew Fusarium Wilt Disease caused by Fusarium oxysporum in Tanzania." *Crop Production*. 139.

Maxwell, S. and A. Fernando. 1989. "Cash crops in developing countries: The issues, the facts, the policies." *World Development*, 17 (11): 1677–1708.

Meinzen-Dick, R., Quisumbing, A., Doss, C., & S. Theis. 2019. "Women's land rights as a pathway to poverty reduction: Framework and review of available evidence." *Agricultural Systems*, 172: 72-82.

Mellor, J.W., 1966. The economics of agricultural development. Cornell University Press, Ithaca.

Mihyo, P., Mihyo, Z., Msami, S., Kivuyo, M., & A. Rukonge. 2019. "Gender and Social Inclusion in the Cashew Nut Value Chain: The Role of Women and Youth in Agro Processing in Tanzania." *Eastern Africa Social Science Research Review*, *35*(1): 29-64.

Ministry of Agriculture, Livestock, and Fisheries (MALF). 2017. Agricultural Sector Development Programe Phase II (ASDP II).

Mmasa, J.J. 2013. "Participation of women in agriculture in Tanzania: Challenges and policy recommendations." Policy Brief No 8. Country Learning Knowledge Network (CLKnet), Tanzania.

Mpenda, Z. 2020. "Empowering Women in Tanzania's Cashew Value Chain: Gaps, Opportunities and Policy Options." Unpublished research report.

Naved, R.T. 2000. "Intrahousehold Impact of the Transfer of Modern Agricultural Technology: A Gender Perspective," FCND discussion paper no. 85, International Food Policy Research Institute, Washington, D.C.

Nikiema, R.A. and T. Sakurai. 2021. "Intrahousehold distribution of sales revenue and household nutritional outcomes: What if the wives controlled the farm revenue?" *Agricultural Economics* 52:1029–1040.

Ogutu, S. O., Gödecke, T., & Qaim, M. 2019. "Agricultural commercialization and nutrition in smallholder farm households." *Journal of Agricultural Economics*, 71(2), 534–555. https://doi.org/10.1111/1477-9552.12359.

Parpart, J.L., S.M. Rai & K. Staudt (eds). 2002. *Rethinking Empowerment: Gender and development in a global/local world*, Routledge, London.

Pavanello, S., Pozarny, P., & Campos, A. P. 2017. Qualitative research on rural women's economic empowerment and social protection. Rwanda Vision 2020 Umurenge public works. Qualitative report.

Pohlmann, K. 2019. Gender transformation in the African cashew value chain: findings from the African cashew initiative's qualitative gender survey conducted in Ghana and Burkina Faso. *Gates Open Res*, *3*.

Porter, Michael E. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Simon and Schuster. ISBN 9781416595847.

Poulson, E. 2016. Gender mainstreaming in agricultural value chains: Promising experiences and the role of rural advisory services. *GFRAS: Lausanne, Switzerland*.

Quisumbing, A. R., Rubin, D., Manfre, C., Waithanji, E., Van den Bold, M., Olney, D., ... & Meinzen-Dick, R. 2015. "Gender, assets, and market-oriented agriculture: learning from high-value crop and livestock projects in Africa and Asia." *Agriculture and human values*, *32*(4), 705-725.

Quisumbing A., J. Heckert, S. Faas, G. Ramani, K. Raghunathan, & H. Malapit. 2021. "Women's empowerment and gender equality in agricultural value chains: evidence from four countries in Asia and Africa." *Food Security* (2021) 13:1101–1124.

Rubin, D.; Boonabaana, B.; and Manfre, C. 2019. Building an inclusive agriculture: Strengthening gender equality in agricultural value chains. In 2019 Annual trends and outlook report: Gender equality in rural Africa: From commitments to outcomes, eds. Quisumbing, Agnes R.; Meinzen-Dick, Ruth Suseela; and Njuki, Jemimah. Chapter 6, Pp. 83-96. Washington, DC: International Food Policy Research Institute (IFPRI). https://doi.org/10.2499/9780896293649_06

Rukonge, A. 2013. "Cashew: Addressing poverty through processing in Tanzania."

Sebstad, J., & Manfre, C. 2011. Behavior Change Perspectives on Gender and Value Chain Development. FIELD Report No. 12. *A Framework for analysis and implementation. USAID*.

Slavchevska, V. 2015. Gender differences in agricultural productivity: The case of Tanzania. *Agricultural Economics*, 46(3): 335-355.

SOFA Team, & C. Doss. 2011. "The role of women in agriculture." ESA Working Paper No. 11-02. Agricultural Development Economics Division, The Food and Agriculture Organisation of the United Nations. FAO: Rome.

Sraboni, E., Malapit, H. J., Quisumbing, A. R., & Ahmed, A. U. 2014. "Women's empowerment in agriculture: What role for food security in Bangladesh?" *World Development*, *61*, 11-52.

Tanzania Investment Centre. 2019. "Regional Profiles of Cashew nut Production and Processing Investment Opportunities in Lindi, Mtwara, Tunduru and Pwani Regions, Tanzania."

Tanzania National Bureau of Statistics (TNBS). 2021. 2019/20 National Sample Census of Agriculture: Key Findings for Crop and Livestock Sectors and Fish Farming.

Timmer, C.P. 1988. “The agricultural transformation.” In Handbook of Development Economics, Vol. 1, eds. H. Chenery and T.N. Srinivasan. Amsterdam: North-Holland.
Timmer, C.P. 2009. “A World without Agriculture: The Structural Transformation in Historical Perspective.” American Enterprise Institute: Washington, D.C.
UN Women; UNDP; UNEP; World Bank Group. 2015. The Cost of the Gender Gap in Agricultural Productivity in Malawi, Tanzania, and Uganda. World Bank Group, Washington, DC. UN Women, UNDP, UNEP, and the World Bank Group. https://openknowledge.worldbank.org/handle/10986/22770
UNIDO, 2011. “Tanzania’s Cashew Value Chain: A diagnostic.” United Nations Industrial Development Organization (UNIDO). Vienna, Austria.
United Republic of Tanzania (URT). 2017. Agricultural Sector Development Programme phase two (ASDP II). Dodoma, Tanzania.
United Republic of Tanzania (URT). 1995. Tanzanian Development Vision 2025. Planning Commission, United Republic of Tanzania.
Valdivia, C., & Gilles, J. 2001. “Gender and resource management: Households and groups, strategies, and transitions.” *Agriculture and human values*, *18*(1), 5-9.
Verhart, N., A. van den Wijngaart, M. Dhamankar, & K. Danielsen. 2015. “Bringing Agriculture and Nutrition Together Using a Gender Lens (No. 6).” SNV and Royal Tropical Institute (KIT): Amsterdam.
von Braun, J., and E. Kennedy. 1994. Agricultural Commercialization, Economic Development, and Nutrition. Johns Hopkins University Press.
von Braun, J. 1995. “Agricultural commercialization: impacts on income and nutrition and implications for policy.” *Food Policy* (20) 3: 187-202.
Wiggins, S., Argwings-Kodhek, G., Leavy, J., Poulton, C., 2011. “Small farm commercialization in Africa: Reviewing the issues.” Research Paper No. 23. The Future Agricultures Consortium. www.future-agricultures.org
World Bank. 2022. Tanzania Gender Assessment.
Wyrod, R. 2008. “Between Women’s Rights and Men’s Authority: Masculinity and shifting discourses of gender difference in Urban Uganda.” *Gender and Society, 22(6)*, 799-823.

APPENDIX A

Appendix Table A1: Summary of codes used for analysis of qualitative focus group discussions

Code Groups	Codes	Number of mentions
1_Context	Aspiration for girls	21
	Cashew market trends	26
	Gender social structures (e.g. norms and values, roles, income	78
2_Household	Allocation of income	22
	Role of husband/men	39
	Role of wife/women	47
3_ Five types of capital (opportunities and constraints)	Financial	13
	Human	16
	Physical	43
	Natural	17
	Social	22
4_Organizational governance	Advantages and disadvantage of membership in a group	17
	Benefit sharing mechanism	18
	Criteria of membership	25
	Decision-making	44
	Group size	14
	Job distribution	14
	Structure	9
5_Group Activities	Challenges	66
	Cost	13
	Processing	27
	Production	32
	Support	2
6_Marketing	Buyers (processed cashew)	21
	Buyers (raw cashew)	14
	End product	14
	Price	10
	Pricing mechanism	9