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Roles and Activities of Women's Participation in Cassava Value Chain: A Case of CAVA II Project in Mara Region, Tanzania

[1]Jacquiline M. Ndossi, Ahmad A. Kyaruzi [2] and Jeremiah R. Makindara[3]

[1]Mwalimu J.K Nyerere University of Agriculture and Technology, Department of Economics and Rural Development. Email: kmandeye@yahoo.com

[2]Sokoine University of Agriculture, Department of Agricultural Extension and Community Development. Email: kyaruzi@sua.ac.tz

[2]Sokoine University of Agriculture, Department of Business Management. Email: makj@sua.ac.tz

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Abstract: *While the value chain approach is often praised for its potential to empower women, specifically smallholder farmers in rural areas, this study critically scrutinizes the actual impact of this approach on the extent of women's involvement in various roles and activities within the value chain. The study was conducted in Rorya, Bunda and Serengeti Districts in Mara Region. The study involved 123 women who were participating in the project A questionnaire was used to collect quantitative data while Focus Group Discussion and semi-structured interviews were used to collect qualitative data. Qualitative data were analysed using content analysis and quantitative data were analysed using the Wilcoxon rank signed test. Wilcoxon rank signed-rank test results revealed women's participation in the value chain changed in a different direction, for example, women's participation in production roles and activities increased. However, Women's participation in processing decreased after the introduction of new and improved equipment such as processing machines. There was no significant change in marketing activities as the participation of women remained poor, especially for distant marketing. It is therefore concluded that interventions which target women in agricultural production can increase their participation in roles and activities. It is recommended that Government and Development Partners programmes should design and implement projects which will enhance women's empowerment and which in turn will increase their participation in roles along the value chain. This will lead to improved livelihood and reduction of poverty in farming communities in Tanzania.*

Keywords: *Value chain, women's participation, smallholder farmers, empowerment, rural development*

1. Background Information

A lot of development organizations strive to see women participating and empowered in value chains (Malapit *et al.*, 2020). This is because women play important roles at different nodes of both agricultural and off-farm value chains (Quisumbing *et al.*, 2021). Women's economic empowerment and increased participation in agricultural commercial and higher value chain activities are critical components of boosting rural development through agriculture (AfDB, 2015). In this paper, the concept of value chain is conceived as the full range of activities required to bring a product or service from conception through the different phases of production, distribution to consumers, and final disposal after use (Porter, 1985). At all stages of the value chain, the key goal is to create value and segment the market with differentiated products to increase profitability (Zamora, 2016).

The agricultural value chain approach has grown in importance as a paradigm for examining changes in global trade commodities and their implications for women's empowerment, a development tool for increasing employment and reducing poverty and as well as an approach for transforming rural areas and reducing poverty (Malapit *et al.*, 2020; Ejike *et al.*, 2018; Riisgaard *et al.*, 2010). For instance, studies by Masamha *et al.* (2017) and Jeckoniah (2013) have demonstrated that participation of women in cassava and onion value chain intervention has resulted in increased women's participation in development activities, their income and ability to provide for their families with basic needs and control and use of assets. According to (Malapit *et al.* 2015 and Kabeer 2005), empowerment is the growth of an individual's ability to make strategic life decisions that take into account their resources, agency, and accomplishments. This is particularly pertinent in situations where individuals have previously been denied this capacity.

However, as claimed by Quisumbing *et al.* 2021 women play significant roles at various nodes of the agricultural and off-

farm value chains, but their contributions are undervalued or constrained due to societal norms in place or restrictions particular to women. Additionally, when participating in the value chain, women face numerous challenges that impede their effective participation. For instance, (Ao *et al.* (2019; International Finance Corporation (IFC) 2016; AfDB, 2015; Coles and Mitchel (2010) and Herinksen *et al.*, 2010). claimed that, across the whole value chain, women face limited access to information, hired labour, technology, assets, networks, restrictions on land ownership and tenure, access to processing equipment, access to market information and spending more time on domestic chores, poor access to inputs, financial services and extension support, low skill and knowledge levels, gender inequalities, and social differentiation.

In Tanzania, there are a lot of initiatives following the value chain approach implemented to overcome the above challenges and empower women, and smallholder farmers. These initiatives are spearheaded by various organizations like Rikolto which was formerly known as VECO focusing on the onion value chain, Irish AID focusing on the cocoa value chain, International Fund for Agriculture Development (IFAD) focusing on the fruit value chain, Oxfam and DANIDA focusing on the vegetable value chain, DANIDA and Concern Worldwide Tanzania focusing on sunflower (MMA, 2012). Other initiatives include the Bill and Melinda Gates Foundation Cassava Adding Value for Africa Project II (CAVA) project in Africa focusing on developing the cassava value chain.

CAVA was one of the projects implemented in five countries in Africa which were Tanzania, Ghana, Nigeria, Malawi and Uganda. The project employed a value chain approach to empower women smallholder cassava along three nodes namely production, processing and marketing. In Tanzania CAVA project was implemented in two phases: phase one was from 2008/9 to 2014. Phase I was then succeeded by Phase II. The CAVA II project was implemented in Mara Region in Tanzania from 2015 to 2019 with the main goal of empowering women socially and economically. The project provided women with training opportunities, provision of appropriate technology, and connecting poor women cassava producers with producers, processors and consumers (Adeleke, 2012).

This study, therefore, was designed to generate new knowledge on the contribution of the CAVA II project towards empowering women's participation in roles along the cassava value chain. This information will be important in bridging the knowledge gap on the influence of the value chain approach on the change of women's roles and activities in the context of the study area. This is critical since most of the previous studies have concentrated on gender roles along with their value (Emmanuel, 2018; Masmha *et al.*, 2017; Khasa and Msuya; 2016, Jeckoniah *et al.*, 2013; Laven *et al.*, 2009). In addition, the study findings will be an important input in improving the value chain approach in empowering women smallholder farmers, especially in communities with strong male-dominated cultures such as participating in value chain activities and generating income. Hence, based on the before and after research design and informed by Kabeer's (1999) theory of women empowerment and Reed *et al*. (2018) theory of participation, the study focused on determining a change in the role and activities of women in the cassava value chain after the implementation of CAVA II project in the study area.

Moreover, women play a critical role in different nodes of the value chain, hence it is crucial to research specific node engagement of women in various nodes of the value chain (Quismbing *et al.*, 2021). This study will therefore research and produce vital information by analysing women's participation in the roles of women in the nodes of production, processing and marketing. The information produced will reveal changes in women's roles after the project and also changes in women's participation in those nodes along the value chain. For this specific study changes which will be analysed are such as roles at the production stage, processing stage and marketing stage.

2.0 Theoretical and Conceptual Framework

The study used two theories of participation and women empowerment. The theory of participation was pioneered by Reed *et al.* (2018) who argue that participation can be explained in terms of design, mediation, democracy, and context as elaborated below.

2.1 Participation as Design

A well-designed participation process can result in well-informed, long-lasting, and adaptable outcomes in a variety of contexts. This is because an effective design process can lead to increased trust and ownership over problems and solutions, and decisions made in these processes are more likely to be accepted and implemented, assisting in the achievement of intended goals more successfully (de Vente *et al.*, 2016). Moreover, as argued by Brookes *et al*. (2013) project design was critical in delivering attitudinal, behavioural, ecological and economic outcomes. Furthermore, Wig *et al.* (2016) suggest that it is during the project's design that stakeholders and the general public are involved. This provides more inclusive information and inputs, which can be used to make more sound decisions. Similarly, poorly designed and facilitated participation can lead to decision-making biases, for example, if the outcomes reflect the information and inputs of overrepresented or dominant participants (Ansell and Gash, 2008).

2.2 Participation as Mediation

Mediation is a method for intervening in conflicts that enables the parties to reach an agreement through the facilitation of a neutral mediator, rather than having a decision imposed on the parties from above or outside (Bell *et al.*, 2011). In participation processes and mediation, the emphasis is typically on stakeholder-directed solutions, rather than having a solution imposed by an outside judge. Mediation aims for win-win solutions rather than win-lose as typically results from legal processes. A mediation process takes place in different phases. It starts with an information phase where participants are informed about the process of mediation, clarifying any questions and setting the scene for the following process. In the next step, the participants collect all relevant information about the mediation. All interests and reasons for the choice of these topics are discussed. Based on this background information and further discussion, potential solutions for the selected topics will be gathered and specified in an agreement (ibid).

2.3 Participation as Democracy

Democratic systems can be in three forms such as direct, representative, or deliberative, with various levels of decentralization and governance (Faguet and Pöschl, 2015; Piattoni, 2009). Furthermore, if societal beliefs (cultures) are to be affected, future human generations and non-humans are more likely to require participation over far longer durations, potentially generational time scales. Continue to argue that engaging the public and stakeholders in these longer-term and more complex participatory change processes is critical. (Ferreyra *et al.*, 2008). However, in this study, contextual factors such as socio-economic, cultural and resource availability were used to explain how women participated in value chain roles and activities.

This theory, therefore, postulates that the availability of resources like technology, capital, markets, and knowledge authority influences stakeholders' participation in the value chain. This means that if they have access to the resources, people will actively participate in any intervention that is implemented. (Reed *et al.*, 2018) and vice versa. This study adopted this theory to look at how agricultural resources provided to women empowered them socially and economically.

On the other hand, to understand and explain clearly how resources empowered women individually when participating in the cassava value chain, a theory of women empowerment by Kabeer (1999) was also applied. It is explicitly stated that if agency or empowerment activities are not incorporated, resources will not produce beneficial results. Women's empowerment, according to Kabeer (1999), is the expansion of an individual's ability to make strategic life choices in settings where such abilities were previously denied. According to this notion, women's empowerment occurs on three levels: deeper, intermediate, and immediate. Women's empowerment is realized at a deeper level when structural relations of class/caste/gender exist, at an intermediate level when institutional rules and resources exist, and at an immediate level when resources, agency, and achievements exist (Kabeer, 1999).

Since the whole aim of this study is to explore how resources and agency provided by the CAVA II project empowered women smallholder farmers, the immediate level of women empowerment was measured. The immediate level of women empowerment explains that if women are provided with resources and can make independent choices on how to use those resources, then they will be empowered. Moreover, analytically, this study adopted the Women Agriculture Empowerment Index (WAEI) by Alkarie *et al.* (2013), which argues that women are empowered if they are in a position to make decisions on production inputs, have autonomy in production, ownership of assets, purchase, sell and transfer of assets, access and decisions over the credit, control over the use of income generated.

This study aimed to explore if roles had increased or decreased along the value chain after the project intervention. Autonomy in production as one of the indicators from WAIE was adopted and was measured. The WAEI defined autonomy in production as the person's ability to act or participate in what he or she values (Alkarie *et al.*, 2013). This indicator probes the person's understanding of the situation and how she/he balances different motivations. According to the theory of women empowerment by Kabeer (1999), the choice includes the meaning, motivation and purpose through which individuals bring to their activity, and their sense of agency or the power within.

For this study, the provided resources together with the ability of individuals to participate in production, processing and marketing nodes of the value chain were measured. In the production node, the following indicators of women's ability to participate in the following roles were measured land preparation, applying manure, planting cassava, weeding and harvesting. At the processing node, the ability of women to participate in the following processing roles was measured washing, peeling, slicing, soaking and pounding. At the marketing stage, the following indicators of women's ability to participate in marketing roles were measured business development services, product development and market penetration skills. Therefore, the relationships of these variables are explained in the conceptual framework of this study as presented in Figure 1.

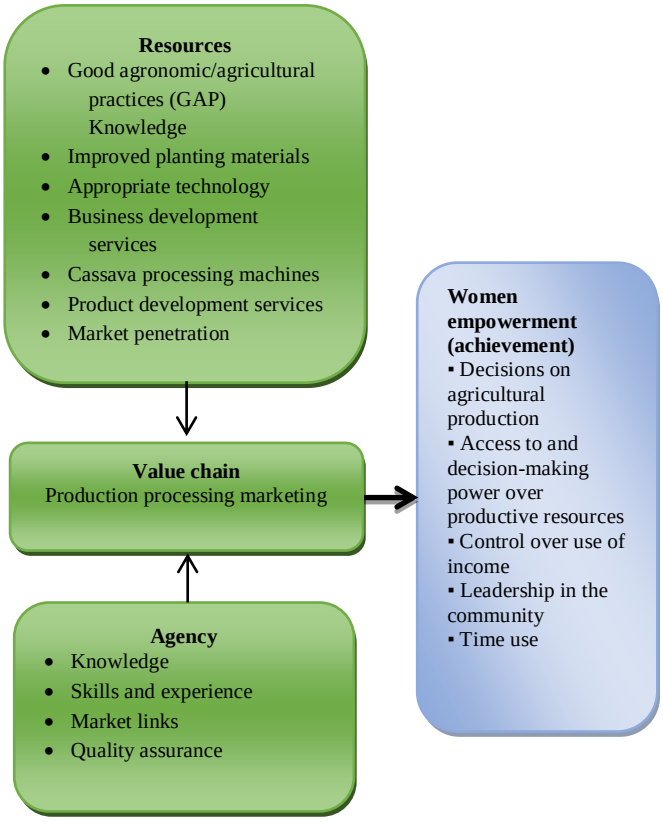

Figure 1: Conceptual framework for women empowerment

3.0 Methodology

3.1 Description of the Study Area

This study was conducted in Rorya, Bunda, and Serengeti districts in Mara Region. These districts were selected purposefully since the CAVA II project implemented its activities. Furthermore, in each of the three districts, the wards in which the project was implemented were purposefully selected. Whereby in Rorya district Ikoma was selected, in Bunda district Guta, Sazira, and Nyamang'uta were selected, and in Serengeti Machira and Morotonga were selected. Furthermore, from all those wards, the researcher went further and purposefully selected all villages that were actively involved in the CAVA II intervention, namely Nyamasanda from Ikoma, Guta from Guta ward, Misis from Sazira, Kaloleni from Nyamang'uta, Bwitenge from Manchira, and Morotanga from Morotanga ward.

3.2 Research Design and Data Collection

This study adopted a cross-sectional research design where data were data collected only once. Data on women's empowerment were collected from April 2020 to June 2020. The study population for this study was smallholder women cassava growers who only participated in the CAVA II project. Both quantitative and qualitative data were collected from 123 women respondents. Quantitative data were collected using a questionnaire whereby a researcher asked questions directly to the respondent. A combination of methods of collecting qualitative data such as focus group discussions (FGDs) and key informant interviews were applied. Three FGDs were conducted using a checklist with an average of six participants per session. The focus group discussion was composed of six women. In these FGDs issues covered were like if there are changes in roles and activities after the project and if the intervention has decreased or increased their participation along the value chain after the project. Key informant interviews were conducted with both districts and ward extension officers. These people were believed to have an in-depth understanding and knowledge of women empowerment in the area after the project since they were the overseers of the project.

3.3 Data Analysis

Quantitative data were analysed using Statistical Package for Social Science (SPSS). Wilcoxon signed-rank test was used to compare the data before and after the project intervention. Qualitative data from FGDs and semi-structured interviews were analysed using a content analysis whereby the researcher started by transcribing the audio record and then translated the transcribed data from Swahili to English and thereafter establish codes which were used to create common themes which were then analysed and guided by research question for this particular study.

4.0 Results and Discussion

4.1 Socio-economic Characteristics of the Respondents

The respondents' socio-economic characteristics as shown in Table 2 reveal that more than half of the respondents i.e. 52% were between the ages of 36 and 55 years. Respondents of this age participated more since they were active in conducting economic activities. Women aged 76 and above made up only 1% of the participants since they were not active enough to engage in any economic activities like agriculture. Moreover, only 26% of the respondents aged 15-35 are believed to be participating more actively in the project activities. In addition, on marital status, 73 % of the respondents were married while 13% were widowed. Moreover, to a large extent, 79% of the respondents had primary education and none of the respondents had tertiary education. Furthermore, economic activities show that at least 38% of the respondents were engaging in crop production, especially cassava production followed by 30% of the respondents who were engaging in petty trade only.

Table 2: Socio-economic activities of the respondents (N=123)

Socio-economic characteristics	Frequency	Percentage
Age		
15-35	32	26
36-55	64	52
56-75	25	20.3
76 and above	2	1.7
Marital status		
Not married	8	6.5
Married	89	72.4
Divorced	2	1.6
Separated	4	3.3
Cohabited	0	0.0
Widow	20	16.2
Education level		
Not educated	20	16.3
Primary education	97	78.9
Secondary	6	4.8
Tertiary	0	0.0
Economic activities		
Crop production	47	38.2
Livestock keeping	1	0.8
Crop and Livestock keeping	17	13.8
Crop livestock keeping and petty trade	20	16.3
Crop and wage Labor	0	0.0
Petty trader	38	30.9

4.1 Change in Roles and Activities of Women in the Cassava Value Chain After Project Implementation

4.1.1 Women's Roles Along the Value Chain Before and After the Project

Cassava production stage

During FGD participants reported that their roles and activities changed after the project since the project introduced improved methods of cultivating cassava. For instance, before the project some of the production activities such as preparing land, women were partially removing grasses using hand hoes only. Additionally, women were not observing proper spacing when preparing terraces or when planting cassava cuttings and also, they were not applying manure.

However, after the CAVA II project interventions, production practices changed as they were able to adopt improved methods of cultivating cassava which were introduced by the project such as new land preparation practices by preparing the terraces after land preparation using hand hoes, rake or tractors. When preparing the terraces women were taught to observe measurements ranging from 0.80 of a metre to one metre (i.e. 80 – 100 centimetres) from one terrace to the other and apply manure at the same time. Also, when planting cassava cuttings, the spacing should be one metre (100 centimetres) from one cutting to the other. Furthermore, before the project, weeding was done three months after planting cassava cuttings and one month before harvesting. After the project, women were weeding any time when grasses had grown to allow cassava roots to have enough space to grow and to have enough sources of food and water.

In addition, before the project, women were not applying any pesticides. However, after the project, the practice is that weeding goes together with spraying pesticides if any. Therefore, as a result of a change in activities, cassava production has increased and men joined women in cultivating cassava. To prove this during FGD women participants agreed that CAVA training enabled them to increase cassava yield. This view is supported by participants who narrated that,

…"My participation in cassava production has increased because the improved methods of cultivating cassava mentioned above are assuring me with enough produce for commercial and consumption purposes." (Women FGD, Miseke village on 15/06/2020)…

…"After applying the improved method of cultivating cassava and the produce to have increased enough for consumption and commercial purposes I am more motivated to participate in cultivating cassava"(Women FGD, 23/04/2020 in Guta village)…

Furthermore, a key informant reported

…"Before the project cassava producers among women cassava producers were very low. However, the participation of women along the cassava value chain increased because of the improved methods which assure women with increased cassava produce for consumption and commercial purposes"(District Executive Director (DED) in Serengeti District Office on 20/05/2020)…

These findings reveal that improved methods and practices in agriculture activities are very crucial among smallholder farmers to increase production, improve food security and for economic development in general. The same was reported by (Osewe *et al*. 2021; Oduniyi and Chagwiza 2021 and Zeweld *et al*. 2020) that the key to having food security, increased household income, and economic, social and environmental benefits is to use improved and sustainable agriculture practices.

Cassava processing

Before CAVA II project interventions, processing was done using traditional methods (manually) whereby to remove toxins from cassava, women were either slicing or soaking the peeled cassava in water piled for three days and then pounded using a pestle and mortar to make cassava flour.

After the introduction of processing machines, the drudgery of women in cassava processing was reduced. After peeling and washing cassava roots, the rest of the processing activities were done by three different machines. The first machine was for grinding the cassava roots; the second machine was for removing all the toxins by squeezing the ground cassava roots. The third machine was the milling machine which transforms the dried ground cassava roots into cassava flour and thereafter the High-Quality Cassava Flour (HQCF) was obtained. The HQCF can be used for different purposes like making *ugali*, buns, *bhajia* bread, and biscuits just to mention a few compared to the cassava flour made using a pestle and mortar which was only used for making *ugali*. However, women revealed initially before the introduction of processing machines processing of cassava was done by women only. Nonetheless, after the introduction of processing machines men were attracted to participate in processing cassava. As a result, women have ample time to participate in socio-economic activities.

All these machines were introduced to the village by the CAVA II project. According to women the modern way is easy, not tiresome and can hardly take eight hours for flour to be ready. This allowed women to have more time for other social and economic activities and time to relax. During FGD women participants commented that,

…"The easiest and the fastest method is the modern one where machines were used to dry and mill the cassava roots into cassava flour. The quality of the flour from the two methods is quite different as the flour processed by using traditional methods can be used to make Ugali only while the flour which is processed using modern way can be used for different purposes like making ugali, buns, bhajia, biscuits just to mention a few". (Women FGD on 23/04/2020 in Guta village)…

These findings suggest that the increased quality of agricultural products is critical when looking for external markets. Thus, improved agricultural mechanization is imperative among smallholder farmers in rural areas. These mechanisms increase the quality of agricultural produce which also means an increase in income. The same finding was reported by Yokamo (2020) that the adoption of improved agricultural technologies is the tool for boosting production and productivity of the agricultural sector, poverty reduction and ensuring food security in developing countries. Moreover as revealed by Yidana *et al.* (2013) processed cassava is quite profitable and contributes significantly to raising women's living standards and ensuring food security for their families.

4.1.2 Change in Women's Participation in the Roles Along the Cassava Value Chain Before and After the Project

The study assessed whether women's participation in the roles and activities along the cassava value chain increased or decreased and the results are presented in Table 3. These findings show that there were noticeable increases in women's participation in all roles and activities along the value chain, as elaborated below.

Changes in production to harvesting activities

Women's participation in the production up to harvesting increased after the project. For example, there is an increase in the frequency of women in land preparation from 39.8% to 44.7%, land tillage from 41.9% to 46.3%, planting from 41.9% to 47.6%, weeding from 41.5% to 44.7%, harvesting from 41.2% to 49.2% (Table 3). According to women respondents, before the project they were using traditional methods to implement production activities. These traditional methods include a lack of observation of proper measurement when preparing terraces planting cassava cuttings, and recycling them instead of using improved cassava varieties. These traditional methods did not allow them to have enough cassava yields for consumption and commercial purposes.

However, according to women, they were more motivated to participate effectively in the value chain after the project intervention since improved methods were introduced. That is, women reported that the project through FFS introduced new and improved cassava varieties. Also, they were taught to observe proper spacing when preparing terraces and during planting cassava cuttings. For instance, when preparing the terraces women were taught to observe measurements ranging from 0.80 of a metre to one metre (i.e., 80 – 100 centimetres) from one terrace to the other and apply manure at the same time. In addition, when planting cassava cuttings, the spacing should be one metre (100 centimetres) from one cutting to the other. These improved methods promised agricultural production orientation to shift from being solely subsistence and for consumption only to being commercial as well. This was due to the assurance of cultivating enough cassava for food, and surplus being sold to obtain family income. These led to a decrease in poverty among women who were supported by the project. Therefore, these improved methods encouraged them to participate in the role as opposed to before the intervention as was revealed during FGD.

…"The participation in this role has increased twice as much since these new and improved cassava cuttings take only eight months to be ready for harvest, tolerate drought, and produce big and healthy cassava roots. Because of this, the yields have increased and hence we are now assured of enough produce for consumption and business purposes" (Women FGD, Sazira village on 15/4/2020)…

Moreover, it was revealed by one of the respondents during FGD that,

…"Before the project, I was able to produce five or fewer bags of cassava roots as compared to after the project, when I was able to harvest ten bags of cassava

roots. I can now use five bags for commercial purposes and increase my income" (Women FGD, Guta village on 23/4/2020)…

These findings are supported by those of Abebe and Alemu (2017) who claim that smallholder farmers in SSA and elsewhere need access to high-quality seeds, as well as the introduction and adoption of improved varieties since improved variety proved to be high yielding potential, drought tolerance, disease resistance and preferred taste.

Changes in the processing stage

The findings show that participation in the fermentation of cassava roots has decreased after the project from 41% to 34% as shown in Table 3. This was due to the introduction of cassava processing machines by the project. The three distinct processing machines that perform three distinct tasks were introduced for processing cassava roots. The first machine crushed the cassava roots; the second machine squeezed the cassava roots to extract all the poisons. The milling machine, which generated HQCF, was the third machine. The advantage of these processing machines was that women had extra time to relax with their families and could as well spend more time in other community productive activities. Processing machines also helped women to improve the quality of cassava flour which was used to make different products like buns, and chapati to mention a few; these products allowed women to generate more income. During FGD one respondent revealed that.

…"Cassava flour processed traditionally is only used to make ugali. However, the flour processed using processing machines is of high quality and used to make bites and ugali. Bites are used for sale as a result my income has increased from TZS 15 000 to 30 000 per month after the introduction of these processing machines. (Women FGD, Miseke village on 15/06/2020)…

Furthermore, the participation of women in processing roles decreased since their roles have changed as these machines are operated by men. This implies the successful adoption of the modern processing machines which were introduced by the CAVA II project. These findings are supported by those from FGD which revealed that,

…"Before the project, all processing activities were done manually by women such as slicing or soaking the peeled cassava in water piled for three days and then pounding using a pestle and mortar to make cassava flour. After the introduction of processing machines, the drudgery of women in cassava processing was reduced. After peeling and washing cassava roots, the rest of the processing activities were done by processing machines. This, in turn, allows them to have ample time to participate in other social and economic activities. (FGD on 23/04/2020 in Guta village)…

These findings imply that improved technology plays a crucial role in transforming the agricultural sector and bringing about significant benefits among smallholder farmers. Improved technology enhances productivity, efficiency and resource management, and reduces time and burden among smallholder farmers, especially women. The same was reported by (Wordofa *et al.* 2021 and Theis *et al.* 2018) that various agricultural technologies are encouraged as a means to improve food security, increase yields and incomes reduce time, reduce poverty and even empower women.

Changes in the marketing stage

The findings show that women's participation in marketing activities has decreased despite the project intervention of providing women with business development services, product development and market penetration skills. For instance, the percentage of women's participation in marketing activities decreased from 32% to 11% as presented in Table 3. Respondents revealed that even after the project their participation in petty business has not increased due to several challenges. For instance, lack of capital, and due to this reason women cannot go far places to search for markets as they need financial resources for transportation, accommodation and food. The other challenge was the lack of packaging skills to meet the international marketing standards of selling the HQCF.

Moreover, women face limited mobility because of restrictions from their husbands. In addition, women also revealed that district councils do not have enough funds to support them to participate and sell their produce in agricultural exhibitions like *Nane Nane*. This to a large extent has affected them to dominate the whole selling market and instead sell their produce along the main road.
These findings are consistent with those of Osui *et al.* (2017) who claimed that at the marketing stage, men dominate the wholesaling and women dominate the retail component. Similarly, Masamha *et al.* (2017) argued that men dominated the high-income urban market while women who participated in the cassava value chain sold their products at local and roadside markets. The same findings were also claimed by Jeckoniah *et al.* (2013) who claimed that for women who participated in the onion value chain, their participation in marketing is constrained by a lack of capital, lack of marketing skills, and lack of support by men who dominate decisions in marketing activities.

Table 3: Women's participation in the roles along the cassava value chain (n=123)

Roles	Women participation			
	Before		After	
	Yes		Yes	
	f	p	f	p
Land preparation	98	39.8	110	44.7
Land tillage	103	41.9	114	46.3
Planting	103	41.9	117	47.6
Weeding	102	41.5	110	44.7
Harvesting	103	41.2	121	49.2
Root preparation	103	41.9	119	48.4

Fermentation	95	40.7	83	33.7
Access to the outside markets to sell HQCF or traditional cassava flour	75	30.5	26	10.6

The findings imply that improved methods of conducting agricultural activities such as good agronomical practices (GAP), improved inputs, mechanized processing and equipping smallholder farmers with business knowledge are crucial, especially for women smallholder farmers. This will increase agricultural production and an increase in the quality of agricultural products which ensures food security and hence reduces women's dependence on men. The same was claimed by (FAO 2018: Abebe and Alemu 2017: Sims *et al.,* 2016: Yidana *et al.,* 2013) that access to high-quality seeds, introduction and adoption of improved varieties which are high yielding, drought tolerance, disease resistance and have preferred taste as well as introducing processed agricultural product is very profitable and has a significant contribution to the increase in women's income, food security for their families as well as improving their living standards.

4.0 Conclusions and Recommendations

Women's roles and activities at different nodes of the value chain changed after the project for instance production practices changed such as land preparation practices by preparing the terraces after land preparation using hand hoes, rakes or tractors. When preparing the terraces women were taught to observe measurements ranging from 0.80 of a metre to one metre (i.e. 80 – 100 centimetres) from one terrace to the other and apply manure at the same time as they were able to adopt improved methods of cultivating cassava which were introduced by the project. Moreover, after the project women's roles at the processing stage changed whereby women were only participating in washing, peeling and slicing the rest of the processing procedures were done by processing machines which are operated by men.

On the other hand, women's participation in the production node in the roles from land preparation to harvesting increased after the project and this was due to the increased yield thanks to the improved methods of cultivating cassava. Moreover, women's participation at the processing stage decreased because of the introduction of three distinct processing machines that perform three distinct tasks of processing cassava and these machines are operated by men. Additionally, women's participation in marketing activities decreased because of several reasons such as lack of enough capital, and due to this reason, women could not go far places to search for markets as they needed financial resources for transportation, accommodation and food. The other challenge was the lack of packaging skills to meet the international marketing standards of selling the HQCF and limited mobility because of restrictions from their husbands.

Based on the key findings from the study, it can be recommended that government, non-governmental organisations and development programmes espousing to empower women should:

- Provide women with the ability to participate in all nodes of the value chain especially more profitable nodes such as marketing nodes. This will be possible if such organisations and programmes empower women with marketing skills which will allow them to compete in both local and international markets
- Remove all societal norms or gender-specific barriers, especially in a patriarchal society. This will empower women to effectively participate and benefit from value chain intervention socially and economically.
- Should make sure that initiatives aimed at empowering women promote technologies that take into account the needs of both sexes at every stage of the value chain and make them accessible at a reasonable cost to women who work as smallholder farmers in rural areas.

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