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Research Application Summary

Economic viability and competitiveness of processed cassava products among rural women in north and north eastern Uganda

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Abstract

Smallholder cassava farmers in Uganda face a range of production and marketing challenges in the cassava value chain. Cassava processing and value addition is fronted as a viable option to alleviating challenges faced by smallholder farmers in the cassava value chain. The study determined the profitability of cassava processing among smallholder cassava farmers in north and north eastern Uganda. Data were collected from 185 randomly selected smallholder cassava farmers in the districts of Gulu, Kaberamaido, Lira, and Soroti. Data processing and analysis were conducted in SPSS and STATA Statistical packages. The results of gross margin analysis revealed positive gross margins per season for gari at $310.41, flour at $597.58 and chips at $407.198, with net return on cost at 1.64 for gari, flour at 1.02 and chips at 1.18. Therefore the study recommends accelerated improvements in cassava market structure, cassava processing and preserving technology so as to make the desirable contribution to the livelihoods of cassava farmers.

Key words: Gari, gross margin, market participation, smallholder farmers, Uganda

Résumé

En Ouganda, les producteurs de manioc à petite échelle sont confrontés à une série de problèmes de production et de commercialisation au niveau la chaîne de valeur du manioc. La transformation du manioc et la valeur ajoutée constituent une option viable pour atténuer les défis auxquels sont confrontés les petits agriculteurs de la chaîne de valeur du manioc. L'étude a déterminé la rentabilité de la transformation du manioc parmi les producteurs de manioc à petite échelle du nord et du nord-est de l'Ouganda. Des données ont été recueillies auprès de 185 petits producteurs de manioc choisis au hasard dans les districts de Gulu, Kaberamaido, Lira et Soroti. Le traitement et l'analyse des données ont été effectués grâce aux logiciels statistique SPSS et STATA. Les résultats de l'analyse de la marge brute ont révélé des marges brutes positives par saison de 310,41 $ pour le gari, de 597,58 $ pour la farine et de 407,198 $ pour les chips avec la rentabilité net de 1,64 pour le gari, 1,02 pour la farine et 1,18 pour les chips. Par conséquent, l'étude recommande des améliorations accélérées en ce qui concerne la structure du marché , la transformation et la technologie de préservation du manioc afin d'apporter la contribution escomptée aux moyens de subsistance des producteurs de manioc.

Mots clés: Gari, marge brute, participation au marché, petits agriculteurs, Ouganda

Introduction

Cassava (*Manihot esculenta* Crantz) is widely acknowledged as a staple food security crop with potential for poverty alleviation (Achem *et al.*, 2013). Production of cassava traditionally is mostly in the tropical countries of Latin America, Asia and Africa. The crop has gained prominence because of its ability to do well in dry areas and the significant contribution to livelihoods of the poor, particularly in Sub-Saharan Africa (Sewando, 2012). Morever, cassava has also low production resource requirements with production stability in the different farming systems (Echebir, 2008).

Cassava is widely grown by over 75% of smallholder farmers in Uganda (Roothaert and Muhanji, 2009; Salami *et al.*, 2010). Eastern region with production of 1,007,091 MT (36.7%) is the leading cassava production area in Uganda. This is closely followed by the northern region with 933,000 MT (34.0%) and central region with 410,000 MT (14.25%) (UBOS, 2013). Despite being tolerant to drought and other marginal conditions and its importance as a source of starch, cassava fresh root is highly perishable lasting only 2-3 days after harvest, very bulky (60-70% water), has toxic content and very low in other nutrients especially protein. Cassava processing and value addition is fronted as a viable option to alleviating challenges faced by smallholder farmers in the cassava value chain. Whereas processed cassava products are important, there is limited information on rural women participation in cassava processing and value addition in Uganda. This has created a big challenge in promoting the marketing of cassava products processed by the rural women as most cassava processors and consumers do not have information on cassava processing and economic implication. Therefore, this study sought to determine the economic viability and competiveness of selected cassava products in north and north eastern Uganda.

Literature review

Cassava value addition and processing is crucial in overcoming the challenges that cassava farmers encounter during marketing (Saediman *et al.*, 2012, 2015). This is because of the nature of cassava roots. A number of empirical studies have revealed that cassava processing enterprises are profitable with positive gross margin and net return to cost/investment (Odoemenem and Otanwa, 2011; Achem *et al*., 2013). However, labour and cassava inputs have been recognized as the major cost constraining elements in cassava processing enterprises (Ibekwe *et al*., 2012; Mugonola, 2013).

Study description

This study was conducted in Gulu, Kaberamaido, Lira and Soroti districts in north and north eastern Uganda. Two parishes per district were purposively selected based on cassava production. A random sampling technique based on the farmers' participation in

cassava processing was embraced in choosing the respondents. Multistage sampling techniques were employed in selecting the districts, sub counties, parishes and the women's groups that participated in the study. Respondents (47) were selected from Gulu, Lira (41), Kaberamaido (39) and Soroti (58) giving a total sample of 185 respondents. Data were collected on production, marketing and inputs, socio-economic factors, farming experience, processing experience, credit access, group membership, contract arrangements, production and marketing information and extension services. This was done during the months of November to December 2015 using pretested enumerator-administered structured questionnaires. Data processing and analysis were conducted in SPSS, Excel and STATA Statistical packages.

Analytical methods

The study computed and compared gross margins of different cassava processed products that exist in north and north eastern Uganda using the information collected. The gross margin analysis technique was employed as used by (Odoemenem and Otanwa, 2011; Achem *et al*., 2013; Wabbi *et al.,* 2013) to compute gross margin as shown in equation 1 below,

$$GM=TR-TVC \quad \ldots\ldots 1$$

Where, GM=Gross margin

TR=Total revenue

TVC = Total Variable Cost

Net return to cost was also computed to ascertain percentage return on the total costs invested in cassava processing as in equation 2.

$$NRC=\frac{GM}{TVC} \quad \ldots\ldots 2$$

Where, NRC= Net return to cost

GM= Gross margin

TVC= Total Variable cost

The Total Variable Cost (TVC) was computed by aggregating the cost of roots, processing and marketing (Adem *et al.,* 2013). Processing costs included the cost of peeling, washing, grating, pulverizing, and toasting (frying). Similarly, marketing costs involved bagging, cost of packaging materials (bags, polyethylene) and transportation to points of sale (markets) and cost of roots, and cassava input costs. The enterprise Total Revenue (TR) was computed by multiplying the quantity (Q) of processed product from 1 ton of roots by the price (P), i.e., Quantity (units) * Price per unit.

Results

As shown in Table 1, the study revealed that the cost of cassava inputs took the largest percentage of the production cost of gari (53%), flour (65%) and chips (78%), similar to the results previously reported by Ibekwe *et al*. (2012) and Ijigbade *et al*. (2014).The second key element that takes huge investment in cassava processing as noted in Ibekwe

et al. (2012) and Wabbi *et al.* (2013) is labour. Labour components for cassava processing included charges for uprooting, transporting, peeling, grating, drying and packaging (Figure 1). These activities vary depending on the level of value addition.

Table 1: Cost elements in cassava processing/Cost analysis

Input category	Gari US Dollar	Flour US Dollar	Chips US Dollar
Fresh cassava roots	100.2	380.0	21.1
Uprooting	11.4	19.8	18.1
Transporting	14.5	9.7	12.1
Peeling/slicing/Washing	12.3	14.8	16.4
Grating	4.4	6.2	5.0
Dewatering	0.3		
Roasting	4.8		
Soy beans	26.5		
Fortification	7.2		
Drying	17.2	18.3	
Milling	3.2		
Packaging	3.3	4.6	4.4
Total Variable Cost	189.2	584.1	346.5

At the time of research 1US$ was selling at 3384 Uganda shilling.

Table 1 reveals that chips and flour processors incur higher production cost than processing gari (a granulated cassava-based product for making instant porridge). The reason could be that gari is a new cassava product that is being picked up and that is why it is produced in smaller quantity as evidenced by the small input of cassava used. Another explanation for low production of gari is unstable prices since it is a new product in these regions.

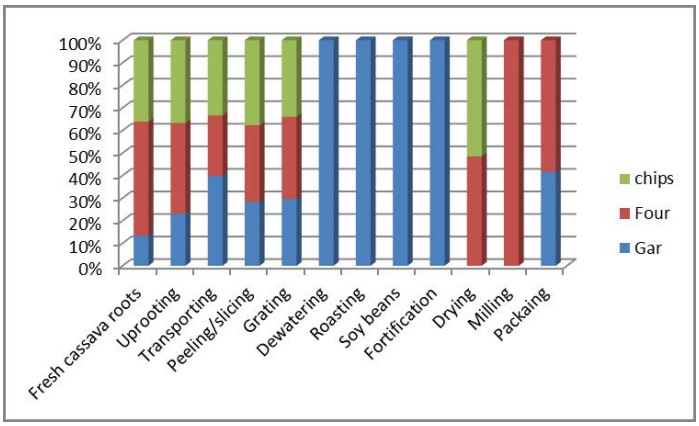

Figure 1: Build up costs for the inputs in percentage of the total cost in cassava processing

Average seasonal productions of cassava products obtained in kilograms are 876, 3788

and 2090 for gari, flour and chips, respectively. This may imply that traditional technology suits flour and chips processing (Ijigbade *et al.*, 2014) . Average prices per kilogram for cassava gari were higher (Uganda shilling 2538, flour at Uganda shilling 1330 and chips at Uganda shilling 850). Results in Table 2 indicate that the net returns/ gross margin for gari was Uganda shilling 1,050,198, flour Uganda shilling 2,021,760 and cassava chips Uganda shilling 2,550,000 per season. These values are similar to those reorted by Ibekwe *et al.* (2012), Emerole *et al.* (2014) and Saediman *et al.* (2015). The returns to variable costs among cassava processors were all positive; gari at 1.64 implying that any shilling invested in gari production returned 164%, flour had 1.02, implying that every shilling invested in flour production returned 102% of the cost, and lastly, chips processor had 1.18, which also implied that every shilling invested in chips production returned 118%. These differences could be due to the different prices received by the different cassava processors, varying units of inputs and the level of value addition.

Table 2: Gross margin analysis for gari, flour and chips production for cassava

Variables	Gari	Flour	Chips
Total revenue	$ 499	$1181	$753
Total Variable costs	$189	$584	$346
Gross margin/Net returns	$310	$597	$407
Net return on Cost	1.64	1.02	1.18

At the time of research US$ was at 3384 Uganda shilling.

This study is still ongoing and more detailed analysis is being done. However, overall, processing cassava appears profitable.

Conclusion

Whereas all the processed cassava products had positive gross margins, gari had the highest return on cost and therefore more earnings to the processors. Cassava processing generally enables value chain participants to overcome the challenges of bulkiness, short shelf life and rapid Post-Harvest Physiological Deterioration (PPD) of Cassava. Therefore, all efforts should be aimed at enhancing value addition in the cassava value chain to enhance incomes of smallholder farmers in north and north-eastern Uganda.

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