Asian Journal of Agriculture and Rural Development

journal homepage: http://aessweb.com/journal-detail.php?id=5005

Effects of Development Interventions on the Productivity and Profitability of Women Shea Butter Processors in the West Gonja District of Northern Ghana

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Abstract

This paper examines the effects of development agencies' interventions on productivity and profitability of women shea butter processors in contributing to the development of the shea nut industry in Northern Ghana. A survey of 114 women shea butter processors, comprising of 57 each of both beneficiaries and non-beneficiaries of development interventions in the West Gonja District were sampled and interviewed with a semi structured questionnaire. Focus group discussions were also held to obtain qualitative data. Results of Analysis of Variance (ANOVA) conducted at 5% level of significance found that labour productivity of beneficiaries of development interventions by way of training, equipment and machinery provisions do not differ significantly from that of respondents who had never benefited from such interventions. Similar results were found with regard to average monthly profit made by beneficiaries and non-beneficiaries. Market sourcing was identified as a major problem affecting women shea butter processors in the district. The study therefore recommends that development agencies programs should highlight follow-up trainings, monitoring and supervisions to ensure the sustainability of projects so that they can continue to yield expected impacts. Also, development agents should include market sourcing opportunities in rural enterprise improvement interventions since that remains a challenge to the realization of development interventions.

Keywords: Development, interventions, shea butter, processors, productivity and profitability

Introduction

The Shea tree is one of the major economic trees growing in arid zones in sub-Saharan Africa. It is largely found in most countries along the stretch of south of the Savannah, from the eastern Senegal through the southern periphery of Ethiopia and down to northern part of Uganda covering countries such as Guinea, Mali, Ivory Coast, Ghana, Togo, Benin, Burkina Faso, Nigeria, Niger, Chad, Cameroon, Central African Republic, Uganda, Congo and Sudan (Pobeda, 1999). The stretch is popularly described as the Shea belt of Africa, and it covers an area of about 1million $km^{2,}$ stretching over 5,000 km long and 400 –

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750 km wide, localized between latitudes 9° and 14°N in West Africa, 7° and 12° N in central Africa and 2° and 8° in East Africa (Sanou and Lamien, 2011).

In Ghana, the shea trees are found predominantly in the three Northern regions. As observed by Hatskevich et al. (2011), the shea trees are concentrated in eastern Dagomba, Southern Mamprusi, Western Gonja, Lawra, Tumu, Wa and Nanumba with Eastern Gonja having the densest stands. However, there is sparse Shea tree cover found in Brong-Ahafo, Ashanti, and the Eastern and Volta regions in the south of the country. The shea trees have both economic and environmental benefits to the people in the north in particular and the entire country at large (Chalfin, 2004; Dogbevi, 2007). The shea nut industry which involves gathering of nuts and processing into butter has been exclusively rural activities largely dominated by rural women who are highly vulnerable to poverty (Boffa, 1999; Hall *et al*., 1996). The Shea business was previously a largely opportunistic trade, with little or no organization supporting it at community level. It was termed an "opportunistic business" because no one has ownership rights over the trees and gathering is equally open to all (Dogbevi, 2007).

In recognition of the commercial opportunities arising from the shea, and the importance of its the products, there has been a proliferation of Shea projects sponsored by United Nations Development Fund for Women (UNIFEM), aimed at providing women with the required knowledge, practice and skills to enable them increase production on a sustainable basis (Chalfin, 2004). Some of these intervention packages come in the form of skill training equipment provision and micro-credit with the aim of increasing the productivity of women share butter processors to take advantage of the growing market for shea products. Other objectives of these projects were to set up ideal production environment for Shea butter processes, identify the marketable quality of Shea butter, and provide business management skills for local women's producer groups and promote entrepreneurship skills in women, and to transform the shea butter production skills and techniques among women processors into a more organized industry.

Although such interventions have made some positive impacts, the industry still encounters numerous challenges which affect the productivity of the industry (Olukoya, 2008). Both the quality and quantity of the Shea butter produced in spite of the number of interventions introduced leave much to be desired. Among the challenges that leads to poor productivity include poor hygiene, use of rudimentary equipment and approach, poor marketing of the product as well as poor management of income accruing from the shea enterprise. However, most of these interventions were aimed at improving the skills and human capital of women processors so as to help improve the productivity and quality of shea butter to meet the taste of both local and international market standards and more importantly reduce poverty among the rural women.

The West Gonja district in the Northern Ghana is one of the remote, deprived and poorest areas in Ghana, and has benefited from such shea butter interventions over the last two decades. This paper therefore explored the influence of the support given by various development agencies on the productivity and profitability of women shea butter processors in the District by comparing the average labour productivity of beneficiaries and non-beneficiaries of these interventions.

Methodology

The research design used for the study was Quasi-Experimental design. Quasi-Experimental design is an experimental design that does not meet all requirements necessary for controlling influences of extraneous variables and often, random assignment of participants is also not possible (Rossi and Freeman, 1985; Kidder and Judd, 1986). Specifically, a comparative group study was employed. The two groups in the study were the beneficiary and non –beneficiary women's group. The difference between these two groups being that one group received external support from development agencies whilst the second group did not receive any form of external support.

All women engaged in Shea butter extraction within the West Gonja District constituted the population of the study. Data was collected from three distinct groups, consisting of women groups that benefited from various interventions, individual women who have been on their own without benefiting from development agencies' support and the organisations that have offered support to women in the District for shea butter extraction.

A sampling size of 114 was then taken for the study. Fifty seven (57) women were then selected from each group (Beneficiaries and Non-beneficiaries) to constitute the sample size. Drawing of lots was used in selecting the beneficiaries group whilst non-beneficiaries were rather selected using snowball technique. Snowball was found appropriate because there was no sampling frame

Productivity Analysis

In this study Labour productivity is indicated as; LP =Y/*H*

Where LP= Labour productivity,

Y = Volume or value of output produced at a given time,

H = Hours spent in the production of outputs

Based on the model developed by Corvers (1997).

Profit analysis

Average monthly profit was calculated based on the formula below:

Profit = Total Revenue (TR) - Total Cost (TC).

Where: Total Revenue = PQ (P is price per kilogram of shea butter produced and Q is quantity of shea butter produced in kilogram).

In Oder to rope in other benefits enjoyed by shea butter processors apart from financial benefits, determined by quantity sold and revenue obtained, benefit / cost ratio was determined based on the formula below:

Benefit /cost = $\sum B_i/\sum C_i$, Where $\sum B_i$ is sum of stream of benefits associated with shea butter processing and $\sum C_i$ is sum of stream of costs incurred in shea butter processing.

Results and discussion

Socio- economic characteristics of the study population

Women shea butter processors interviewed for this study were largely within economic active age bracket with the youngest being 23 years while the oldest being 69 years, with a mean age of 34 years. While a few (7%) women beneficiaries of development agencies interventions were within their youthful age of 20 – 30 years brackets, about 40.4% of the 57 women shea butter processor who have never benefited from any intervention in their enterprise, also fall within the youthful age bracket.

Marriage is acknowledged as a very important institution in the Ghanaian society. It is believed that marriage enhances the social

status of individual in the society, and for that reason people attach prestige to marriage in Ghana including the people in the West Gonja district in Northern region (Chitambar, 1993). In the light of this, marital status of respondents was recorded as relevant demographic information. Results of the study as shown in Table 1 indicates that most of the women shea butter processors surveyed were married; with 70.2% and 80.7% of beneficiaries and non-beneficiaries respectively being married women.

Education is recognized as a very important basic social institution (Chitambar, 1993). In respect to this, the educational level of respondents was analysed to determine the influence of respondents' education on their status. Women shea butter processors in the District generally lack formal education. About 66.7% of beneficiaries and 56.1% of non-beneficiaries have no formal educational background while 29.8% and 40.4% of beneficiaries and non-beneficiaries respectively have a basic level educational background. However, only 2 respondents each of the beneficiary and non-beneficiary groups were educated beyond basic educational level.

Women shea butter processors surveyed for this study obtained their start-up capital from diverse sources. Whiles some raise their capital from personal or family savings, others took loans from formal credit sources such as rural banks or microcredit schemes operated by NGOs operating in the study area. As shown in the Table 1, most respondents obtained their start-up capital from their own personal savings with about 70.2% and 91.2% of beneficiary and non-beneficiary groups respectively indicating that they raised their initial capital from their own savings.

Table 1: Socio-economic characteristics of respondents

Socio-economic Characteristics		Status of Respondent			
		Beneficiary		Non-beneficiary	
		Number	Percent (%)	Number	Percent (%)
Age of Respondent	20-30years	4	7.0	23	40.4
	31-40years	16	28.1	14	24.6
	41-50years	21	36.8	12	21.1
	51-60years	10	17.5	3	5.3
	Above 60years	6	10.5	5	8.8
Total		**57**	**100**	**57**	**100**
Educational Level of Respondents	No formal Education	38	66.7	32	56.1
	Basic Educational Level	17	29.8	23	40.4
	Beyond Basic Education	2	3.5	2	3.5
Total		**57**	**100**	**57**	**100**
Marital Status	Married	40	70.2	46	80.7
	Single	17	29.8	11	19.3
Total		**57**	**100**	**57**	**100**
Source of Initial Capital	Formal Credit	15	26.3	2	3.5
	Personal Savings	40	70.2	52	91.2
	Cooperative/Association	2	3.5	3	5.3
Total		**57**	**100**	**57**	**100**

Source: Field survey, 2009

Profitability of Shea Butter Enterprise

In every investment it is important to compare the production or investment cost and the financial benefit accrued to determine the profitability of the investment. Shea nuts are the main raw material in shea butter processing. The study found that the respondents either buy their nuts or pick them from the wild during the shea nut picking season, usually between May-July. However, the study established that most respondents interviewed (98.2%) for this study supplemented the shea nuts they gathered from the wild with what they buy from others from community markets. Another cost element in shea butter processing is labour input. Women shea butter processors relied much on family labour to meet the labour requirement of their shea butter processing enterprise. Labour is required in cracking shea nuts, milling and extracting of the shea butter. Labour was valued by finding out how much women would charge when similar services are rendered to them by other people. Others cost elements were fuel cost, milling cost, transportation and marketing cost.

In determining Total Cost (TC), depreciation or capital consumption allowance was excluded since the equipment used by respondents in their shea butter business have long life span and are used for domestic activities as well. For instance metallic pots used in parboiling and roasting shea nuts, according to the women can be used for over two decades and it is often used in cooking, pito brewery and storing water for family consumption as well (Bille, 2009).

The poor nature of record keeping among women shea butter processors in the study area, made it extremely difficult for women in providing specific details. Average monthly profit was calculated based on the formula below:

Profit = Total Revenue (TR) - Total Cost (TC).

Where: Total Revenue = PQ (P is price per kilogram of shea butter produced and Q is quantity of shea butter produced in kilogram).

The calculation of profits reveals that average monthly profit made by respondent was GH ¢10. 25. Overwhelming majority (85%) made profit while 13.2% of the respondents made losses and two respondents broke even. Also Analysis of Variance conducted to ascertain whether the profit made by beneficiaries is significantly different from what is made by non-beneficiaries, reported no significant difference in the level of profit made by beneficiaries and non-beneficiaries at 5% level of significant as shown in Table 2. Thus monthly profit made by beneficiaries of development interventions is not significantly higher than what is made by non-beneficiaries. The short lived nature of the various support interventions could account for this trend or results. According to beneficiaries the machines provided frequently broke down compelling beneficiaries to revert to their old ways of processing as in the case of the non-beneficiaries.

In order to rope in other benefits enjoyed by shea butter processors apart from financial benefits, determined by quantity sold and revenue obtained, benefit / cost ratio was determined based on the formula below:

Benefit /cost = $\sum B_i/\sum C_i$, Where $\sum B_i$ is sum of stream of benefits associated with shea butter processing and $\sum C_i$ is sum of stream of costs incurred in shea butter processing.

Respondents were asked to indicate the average amount of shea butter consumed, given to friends and for other purposes. Other benefits associated with shea butter aside

selling of shea butter are; using of by-product of shea butter for cementing walls of local buildings and as fuel for cooking. The benefit / cost analysis reveals an average benefit / cost ratio per respondent of 1.32 (benefit exceed cost by 32% of the cost), with a maximum benefit / cost ratio of 2.1 (benefits more than double the costs incurred) and a minimum of 0.79 (benefit fall below cost by 21%).

Analysis of variance of Benefit / Cost ratios conducted at 5% level of significance found no significant difference between Benefit / Cost ratio of beneficiaries and non-beneficiaries. Thus the benefit obtained from shea butter processing relative to cost incurred for beneficiaries is not significantly different from that of non-beneficiaries.

Table 2: ANOVA on Shea butter profitability

Source of variation	Sum of squares	df	Mean square	F
Between groups	132.711	1	132.711	2.286
Within groups	6501.895	112	58.053	
Total	6634.605	113		

Source: Field survey, 2009 $F_{tab.}$ (1, 112) = 3.90 P<0.0 Not Significant

Table 3: ANOVA on benefit / cost analysis of Shea butter as per bag of 50 kg

Source of variation	Sum of squares	df	Mean square	F
Between groups	112	1	0.112	1.865
Within groups	6.746	112	0.060	
Total	6.858	113		

Source: Field survey, 2009 $F_{tab.}$ (1, 112) = 3.90 P<0.05 Not Significant

Analyzing the Productivity of Shea Butter

Productivity of women shea butter processors was assessed in terms of quantity of shea butter produced in kilogram per man-hour used in producing it in a year, thus quantity produced per man-hour. Women shea butter processors covered by this survey used mainly family and group labour for their labour energy requirement. Women Beneficiaries work in groups when undertaking activities such as roasting, milling and kneading of the shea nuts while non-beneficiaries work as individuals in their various homes. For that matter labour unit was determined by the number of hours man energy was engaged in producing a given quantity of shea butter. Man energy or labour are required in activities of shea butter processing such as parboiling, drying, cracking of shea nut, frying, milling and kneading and scooping shea butter.

Women usually measure the quantity of shea butter produced in calabash. To determine the unit of shea butter in kilogram, an experiment was conducted with three women prior to actual data collection for this survey. In the experiment, a bag of shea nut (50kilograms) was purchased and processed by the women using their method of processing to determine the average number of calabashes to be obtained in a bag of shea nuts and the average weight of a calabash of shea butter in kilogram. Results from this experiment were compared with results of similar findings obtained from programme documents of supporting institutions.

In determining the quality of shea butter produced by respondents, sample of shea butter produced by them was collected and subjected to quality examination with guidance from experts in the field (Ghana Standard Board and Food and Drugs Board).

Productivity=

$$\frac{Quantity\ of\ Shea\ Butter\ Produced\ in\ a\ year\ (measured\ in\ Kilogram)}{Labour\ (Man-hour\ used\ in\ Peoducing\ Shea\ butter)}$$

From the analysis, average productivity was found to be 0.632kg of shea butter per hour of man labour input with a maximum of 0.89kg of shea butter per hour of man labour input and a minimum of 0.05kg of shea butter per hour of man labour input. The results also established that women interviewed processed 7 to 12 bags of shea nut annually producing between 220kg to 300kg of shea butter annually. This compares fairly well with the findings of Derks and Lusby (2006) that on the average a woman could make 5-10kg of shea butter a day which she may only do once or twice a week depending on her other activities and need for cash.

Also the respondents said they spent between 38 to 48 hours per week in shea butter processing, with one or two cycles of production weekly, where they usually processed less than one bag of shea nuts monthly. Lack of market was mentioned as the main reason why they do not produce larger quantities.

Productivity per respondent was calculated using the formula above and analysed using bi-variate Analysis of Variance to determine if there existed any significant difference between productive figures of beneficiaries of development interventions and non-beneficiaries. The result of the analysis in Table 4 reveals that beneficiaries of development interventions do not significantly differ from non-beneficiaries in terms of productivity at 5% level of significance. Results not significant means the null hypothesis "no difference in productivity of shea butter produced between beneficiaries and non-beneficiaries" was accepted, meaning there was no evidence for a treatment effect. Although development interventions were aimed at helping beneficiaries to improve on the productivity of their shea butter processing ventures it appeared not to be the case since non-beneficiaries were doing better than beneficiaries.

The beneficiary group of Damongo had stopped production for the past three years for lack of market and also because some parts of the processing plant had broken down. Another reason for the trend was that beneficiary women of development support were acting as middle women between non-beneficiary women and buying agents thereby creating opportunities for non-beneficiaries to increase production. The average productivity per non-beneficiary respondent was found to be 0.66kg of shea butter per man-hour of labour as against 0.62kg of shea butter per man-hour of labour in the case of beneficiaries.

Table 4: ANOVA on Productivity between Beneficiaries and Non-Beneficiaries

Source of Variation	Sum of Squares	Df	Mean Square	F
Between Groups	0.042	1	0.042	2.240
Within Groups	1.697	90	0.019	
Total	1.739	91		

Source: Field survey, 2009 $F_{tab.}$ (1, 90) = 3.95 P<0.05 Not Significant

Influence of Shea Butter Processing Method on Productivity

Shea butter quality is a function of both the processing method used and the nature of nuts genetics (Bonkoungou, 2005). Respondents use either the improved method or the indigenous method in shea butter processing. The method of production used is expected to influence the productivity of the output as reported by Bonkoungou (2005). The improved method is expected to help increase productivity and reduce drudgery associated with shea butter processing and hence should perform better than the indigenous method. The analysis of variance of productivity figures of those who used the indigenous method as against those who used the improved method of shea butter processing, found no significant differences in their productivity figures at 5% level of significance. From the analysis, the average productivity of those who used improved method was found to be 0.614kg of shea butter per man-hour of man labour input as against 0.655kg of shea butter per man-hour of those who still used indigenous method of shea butter processing.

In other words productivity figures do not differ between respondents using indigenous or improved method of shea butter processing. But for one beneficiary who used the indigenous method, all the other beneficiaries used the improved method in processing their shea nuts because the equipment and machinery used in the improved method of shea butter processing have been offered by the development agencies. Beneficiaries abandoned broken equipment and machines for lack of technical expertise in repairing them. This lays emphasis on Hyman et al. (1988) suggestion that a strategy for disseminating technology must be based on a clear identification of the target beneficiaries and their resources and constraints.

The group ownership of machines does not allow individuals to take proper care of the machines thereby reducing the performance of the machines. This situation accounted for the trend of findings, since those who used improved method were expected to have high productivity than those who used the indigenous method.

Table 5: ANOVA on Method of Shea Butter Processing and Productivity

Source of Variation	Sum of Squares	Df	Mean Square	F
Between Groups	0.039	1	0.039	2.053
Within Groups	1.701	90	0.19	
Total	1.739	91		

Source: Field survey 2009 $F_{tab}(1, 90)$ $P<0.05$ Not significant

Conclusions and recommendations

This paper examined the effects of development interventions on the productivity and profitability of women shea butter processors in the West Gonja District of Northern Ghana. The results from the ANOVA reported no significant difference in the level of profit made by beneficiaries and non-beneficiaries ($p < 0.05$). The monthly profit made by beneficiaries of development interventions was not significantly higher than what is made by non-beneficiaries, probably because of the short lived nature of development interventions given. The machines provided frequently broke down compelling beneficiaries of development agencies support to revert to their old ways of processing.

The average productivity per beneficiary was 0.66kg / Man-hour and 0.62kg /Man-hour for non-beneficiary. The results of the analysis reveals further that beneficiary of

development interventions do not significantly differ from non-beneficiaries in terms of productivity at 5% level of significant.

The study can therefore conclude that shea butter processing is a viable income generating venture for women of West Gonja District and the role development agencies' interventions cannot be under scored provided they are well coordinated and monitored to ensure the needed impact and onward sustainability. The study justifies that shea butter production indeed is a viable venture. It is against this background that women of the study area have continuously engaged in the enterprise for their survival.

Development agencies programs should highlight and concentrate on follow-up trainings, monitoring and supervisions to ensure the sustainability of projects to continue to yield the expected impact since the study found that interventions do not continue to be significantly beneficial to the people soon after projects are ended. Market sourcing was identified as a major problem affecting the productivity of women shea butter industry in the district. The research also recommends that development agents should actively include market sourcing opportunities in rural enterprise improvement interventions since that remains a challenge to the realization of development interventions.

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