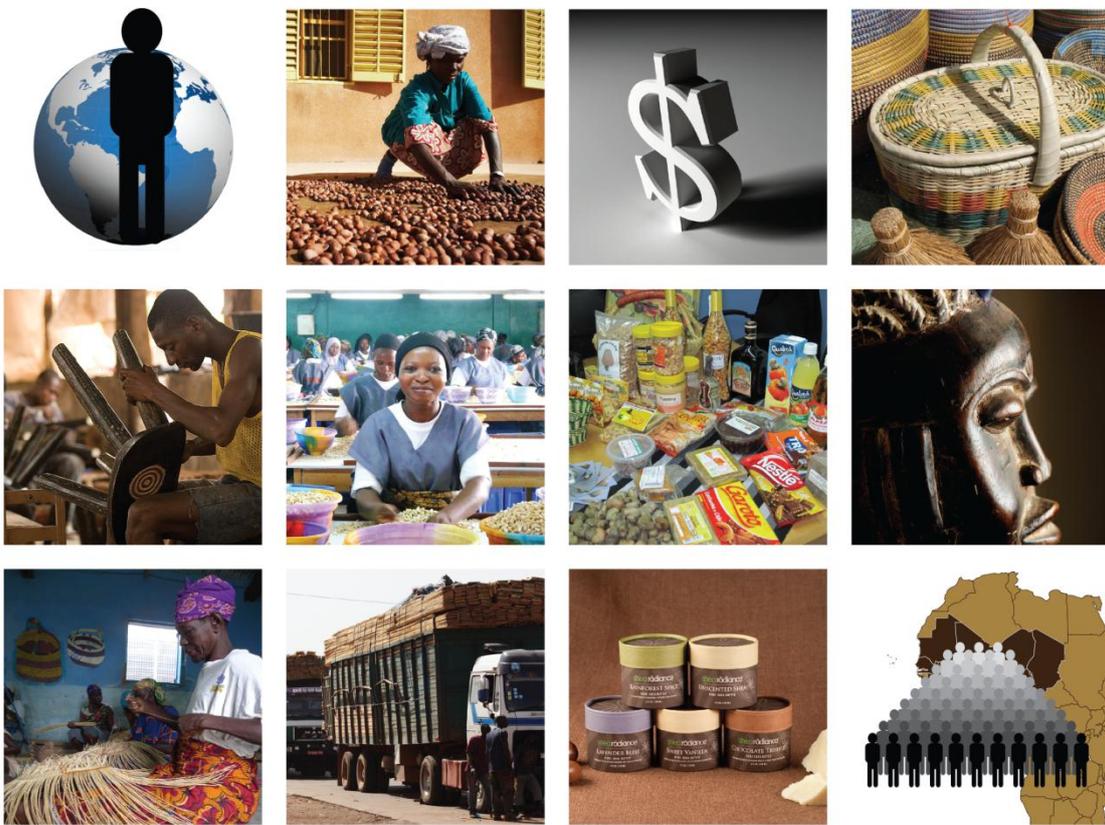




# *Exports, Employment and Incomes in West Africa*



## WEST AFRICA TRADE HUB TECHNICAL REPORT #39

**JANUARY 2011**

This report was written by Prof. Daniel W. Bromley for the United States Agency for International Development with research contributed by the University of Ghana and with data collection assistance from Volunteers of the U.S. Peace Corps. The report was prepared by the USAID West Africa Trade Hub, which is implemented by Carana Corporation.

# EXPORTS, EMPLOYMENT AND INCOMES IN WEST AFRICA

*WEST AFRICA TRADE HUB TECHNICAL REPORT NO. 39*

January 2011

## **Acknowledgments**

The author wishes to express gratitude to the numerous individuals in the countries that participated in this study who donated hours of their time to answer questions. This report could not have been produced without the support of USAID's West Africa Trade Hub under the direction of Vanessa Adams. The able assistance and devotion of Kafui Djonou was instrumental in coordination of field activities; Jane Owiredu-Yeboah administered the contracts; and, Nathan Van Dusen reviewed drafts of the study. Dr. Jeffrey Cochrane of USAID's Economic Growth team provided clarity of purpose and ensured its fit with USAID's broader development agenda. The University of Ghana was a critical partner as were volunteers of the U.S. Peace Corps in Burkina Faso, Ghana and Mali.

## **DISCLAIMER**

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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## Foreword

The Office of the United States Trade Representative (USTR) works closely with the USAID West Africa Trade Hub to facilitate trade between the United States and West Africa, and to encourage countries in the region to better utilize the trade opportunities offered by the African Growth and Opportunity Act (AGOA). AGOA was enacted in May 2000 to expand U.S.-Sub-Saharan African trade and investment, encourage regional integration, and promote economic growth by providing trade preferences to countries making progress in implementing economic, legal, and human rights reforms. Under AGOA, eligible Sub-Saharan African countries can export thousands of products to the United States duty-free. Nearly 6,500 products are covered—from apparel to automobiles and footwear to fruit. As a result, almost 95% of African exports to the United States now enter duty-free either under AGOA, the U.S. Generalized System of Preferences, or under a non-preference (normal-trade-relations) zero rate of duty.

AGOA also provides a framework for technical assistance to help countries make the most of trade preferences. The West Africa Trade Hub is funded by USAID to provide AGOA-related training to individuals and to provide firm-level technical assistance to West African companies in the following sectors—shea, cashew, apparel, home décor and accessories—among others. In 2009, the USAID West Africa Trade Hub facilitated over \$20 million in exports and drew investments of more than \$1 million into West Africa.

At a time when there are questions about export-led growth and the benefits of trade for the poorest countries in Africa, this new report by the Trade Hub illustrates the broad economic impact or “multiplier effect” of export sales generated by West African producers of cashew, shea, hand-woven baskets and wood artisanal products. The report also illuminates the critical factors impeding the growth of productive capacity and export competitiveness, such as inadequate or high cost transport and other infrastructure constraints, lack of access to affordable credit and supply shortages of raw materials.

So the findings in this study are important—they assist us in measuring the economic impact of export growth in the shea, cashew and home goods sectors in West Africa and contribute to our understanding of the link between export growth and the economy, including employment and incomes. The implications of this research are also significant for policymakers, researchers and other experts in the trade and development communities, and for policies and programs that support trade and development in the West Africa region.

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## Executive Summary

The pressing challenge in development assistance programs is to make sure that donor efforts give rise to meaningful and sustainable improvements in the livelihoods of the poor. The African Growth and Opportunity Act (AGOA), which is Title I of the U.S. Trade and Development Act of 2000, seeks to enhance global market access for African products—especially to the United States. Many development experts consider enhanced trade to be the *sine qua non* of job and income growth on the African continent.

Four sectors of the West African economy—basket weaving, wood carving and furniture, cashews, and shea—have received major attention through the USAID West Africa Trade Hub. This report documents the beneficial impacts on poor West African households attributable to increased output—sales—of these sectors. Estimates of employment and household income are reflections of the *structural* attributes of West African economies. The employment and regional household income multipliers reported here tell us of the “ripple” effects in West Africa when cashew or shea farmers, or basket makers and wood carvers, increase their sales for export markets in the United States and Europe. We see here important information on the livelihoods of some of the poorest households in West Africa. Of greater importance, two sectors discussed here—basket weaving and shea production—are the exclusive province of women.

The study reveals that income multipliers in West Africa lie between 1.58 and 2.43. This means that \$1,000 of sales of a basket maker, a wood carver, a cashew farmer, or a shea farmer (important household income in its own right) produces *additional* household income in the local economy of between \$580 and \$1,430, depending on the product and conditions of the local economy. Employment (job creation) is more difficult to measure for agricultural households since farmers work all of the time on a wide range of enterprises (cash crops, food crops, livestock, etc.). Despite those empirical difficulties, employment multipliers reported here indicate that for \$1,000 of sales, between 100 and 160 jobs are supported in the local economies where those sales occur. These are *current* jobs per \$1,000 of sales in each of the four sectors. If the production of these sectors could be increased by \$1,000 it is reasonable to suggest that jobs in West Africa would increase accordingly.

One unfortunate aspect of the current economic structure leads to enormous losses in household income in the region. This lost value added arises because approximately 95% of total production of cashew nuts escapes, or “leaks out of”, West Africa for processing in India and Vietnam. The study shows that if just 75% of current exports of raw cashew nuts could be processed in West Africa, the resulting household incomes would match the *entire export value* of raw cashew nuts in 2006. This demonstrates the importance of adding value in West Africa.

There are important long-run benefits to be realized by the presence of a large and robust processing industry for cashew. We could expect to see beneficial effects on producer prices as processors bid for higher-quality nuts, and the processors could be expected to collaborate with cashew farmers to upgrade nut quality as well as total yields. It is too soon to tell if greater processing potential would lead to long-term contracts between growers and processors, but that should not be ruled out.

Unfortunately, the promise of increased production and exports is often foiled by policies and general circumstances in the economies under study. One of the major benefits of a program such as that of the West Africa Trade Hub is that it helps to connect producers in West Africa to the global market economy. When producers in West Africa engage the global market, not only do they have a chance to sell their commodities in that market, but they receive essential feedback concerning the quality of their product, and its cost vis-à-vis producers of similar

products elsewhere in the world. This information then permits West African producers to refine quality and production costs in order to compete in the global economy. In this way, exports to the global economy are a means whereby the economies of West Africa can be “upgraded” to allow them to provide sustainable income growth over time. Engaging the global economy enhances *economic coherence* at home.

The report documents the important role of the West Africa Trade Hub in overcoming many of the long-standing barriers to greater exports from the region. This is especially important in light of the persistent headwinds recently faced by producers. West African handcraft exports have suffered since a peak in 2001. Intense competition from Vietnam has been extremely hard on the basket sector. Wood products also suffer from the global recession that began in 2007. A more encouraging finding is that total exports of shea and cashew have increased over the recent past and the outlook remains somewhat positive.

Because the global recession has hurt exports from West Africa, development assistance to the region is even more important now than it was when AGOA was created in 2000. These systemic problems in West Africa have precluded the region from enjoying all of the potential advantages of export-promotion activities.

Wood carvers and furniture makers are stifled by poor production facilities, indifferent management, and lack of design input from target markets. Cashew farmers face persistent low prices that threaten the continued protection and enhancement of their cashew trees. If prices remain low farmers will face pressure to remove this important tree crop and replace it with some other enterprise promising higher economic returns. Soil erosion and degraded microhabitats would surely follow. Very low prices for shea mean that women have little incentive to collect and process this free gift of nature. Moreover, seasonal labor shortages in Mali and Burkina Faso mean that approximately one-half of annual shea nut production falls to the ground and rots before it can be collected. Higher shea prices would reverse this ominous trend.

The transport sector stands as the single most important hindrance to enhanced exports. Transport costs and delays at frequent checkpoints are among the worst in the world. The research shows that a 10% reduction in transport costs in Ghana could bring a 1-2% increase in the farm-gate price to cashew producers. For shea nuts coming from Bamako, a reduction in transport costs of 10% could bring a 7-8% increase in shea prices to women producers in Mali.

Producers face short-term interest rates of up to 30% A.P.R. Supply shortages of straw threaten the basket-making activities of extremely poor women in one of the poorest regions of Ghana. This reflects the double-edged nature of globalization. Basket makers in Vietnam have enjoyed the benefits of industrial-scale manufacturing of Ghanaian “Bolga” baskets. Government programs there provide low-cost credit, they help solve problems in the supply chain for straw, and they assure that transportation facilities are conducive to the movement of straw and the final product. This is an example of how comparative advantage can be created and further enhanced through coherent policies by governments. There is no reason why West African governments cannot follow a similar path to support industries like basket making. If they do nothing, all of the best efforts of the international donor community will have little effect.

## Introduction

The African Growth and Opportunity Act (AGOA) is Title I of the U.S. Trade and Development Act of 2000, the purpose of which is to offer incentives for enhanced trade between particular African countries and the United States. Programs to enhance global market access for African products can be understood as part of an effort to stimulate new jobs and incomes in Africa through the augmentation of exports. Many development experts consider enhanced trade to be the *sine qua non* of job and income growth on the African continent.

Important program support to make sure that the benefits of AGOA are realized comes through efforts to promote African products in U.S. markets, and to improve the efficiency of value chains that generate those products.

This report concerns four sectors of the West African economy that figure prominently in the programmatic portfolio of the USAID West Africa Trade Hub: basket weaving, wood carving and furniture, cashews, and shea. The specific subject of this report is to summarize a research endeavor devoted to the estimation of the multiplier effect of increased exports on jobs and incomes in West Africa—with emphasis on Burkina Faso, Ghana, and Mali. The endeavor led to the derivation and application of multipliers that document the impacts on livelihoods of some of the poorest households in West Africa. Of equal importance, two sectors discussed here—basket weaving and shea production—are the exclusive province of women.

The first part of the report introduces and explains the concept of a value chain. The second part discusses employment and income multipliers. The final part analyses the economic implications of production and exports for each of the four sectors—baskets, wood carving, cashew, and shea—as part of assessing the impacts of trade preference and capacity building programs.

The studies reported here are based on extensive field research carried out in early 2010.<sup>1</sup> Approximately 85 questionnaires were administered to women shea producers in the Koulikoro district of Mali. For cashew farmers, 80 questionnaires were administered in February 2010, and another 67 in April, in the west central region of Ghana. In addition, cooperatives and associations were sampled to gain a more complete picture of the processing of these two commodities. Several commercial cashew and shea producers were also interviewed. For the handcrafts sector, 118 women basket makers were interviewed in the immediate vicinity of Bolgatanga, and 116 wood carvers/furniture makers were interviewed in the immediate region of Kumasi.

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<sup>1</sup> The individual reports produced by University of Ghana, Legon, on income generation in the basket and wood products sectors, and the cashew sectors, are set out in Appendices IV and V respectively in the consolidated version of this report.

## 1. Value Chains and Multipliers

### A. The Value Chain

The concept of a value (or commodity) chain refers to the distinct junctures as a commodity moves from its initial production (or creation) to its ultimate purchase by the consumer.

Each of these junctures represents *a transfer of ownership*. This transfer of ownership does not automatically entail any “value added” at one (or more) of those junctures. For instance, when a cashew farmer sells raw cashew nuts to a trader, the ownership of those nuts changes immediately, but they are still the same raw cashew nuts until the trader moves them to another location—thereby giving them what economists call “space utility.” When the trader sells the nuts to a cashew processor, ownership changes once again. The trader has “added value” to the nuts by moving them to a processor, and the processor will then “add value” by changing the nature of the nuts (creating what we call “form utility”). When the processor has finished with them, the nuts can be sold to an exporter (a market transaction), or the processor can choose to export the nuts—thereby keeping the “transaction” inside of the firm. Perhaps the processor transfers the nuts from the account of the processing division to the account of the marketing division. A new element of “space utility” is introduced as the nuts move from processor to export terminal. As a product moves along the value chain, a number of other firms play an important supporting role. Examples would be the transport sector, communications, insurance, fuel and tires, banking, and legal services.

The concept of a value chain is illustrated below through shea—a commodity of extreme importance to women in much of West Africa (Figure 1.1).<sup>2</sup> Figure 1.1 depicts income flows to village women who produce shea and then sell the nuts for export or for retail sales within West Africa.

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<sup>2</sup> A focus on shea reveals one of the more complex value chains in West Africa.

Figure 1.1: The flow of income to village women

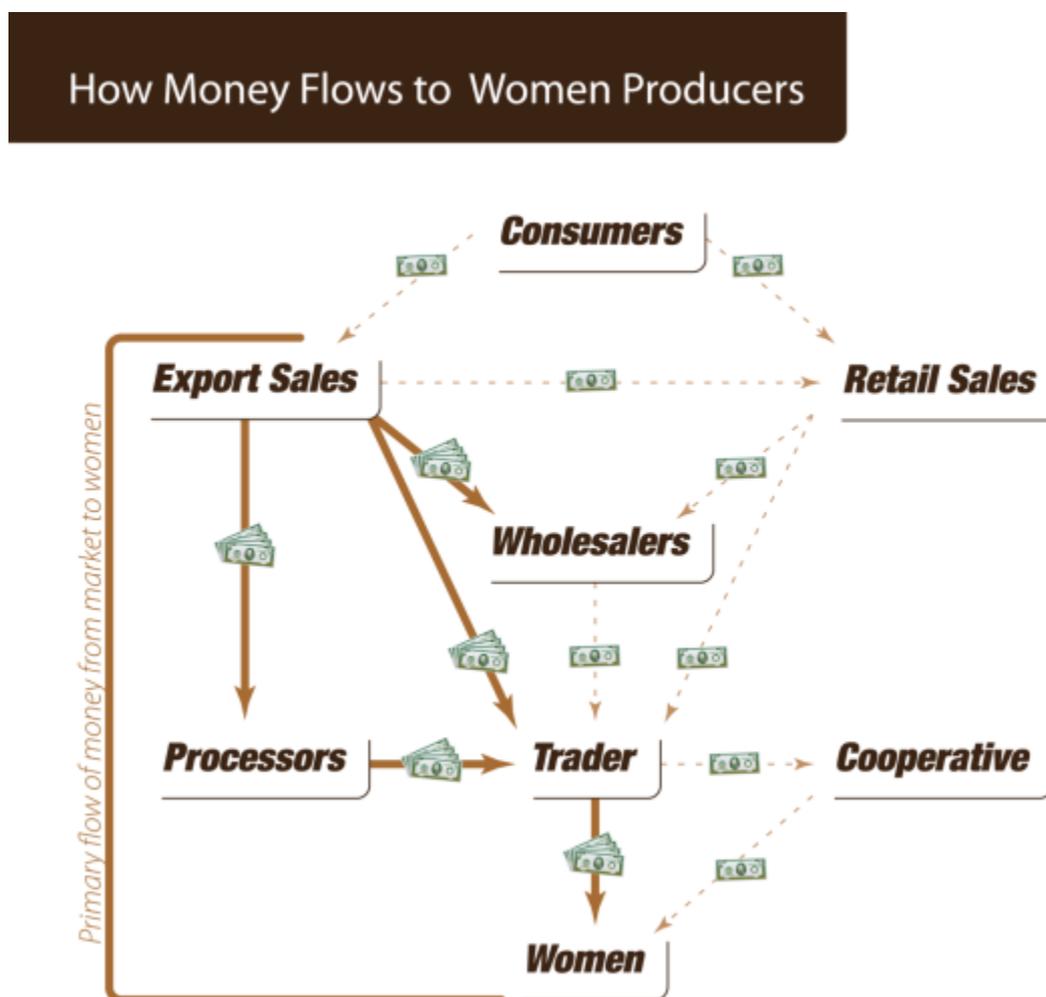


Figure 1.1 shows three different types of income flows. First, the dashed line between the village (here consisting of individual family compounds and the local market) and cooperatives reflects the unclear nature of the economic transaction between women as producers of shea kernels and butter, and those same women as members of local associations/cooperatives. This particular juncture is not always a regular “market transaction” where ownership changes hands. Members of cooperatives often receive a variety of payments for their shea kernels, and their contribution of labor to the cooperative is often hard to measure.

The other dashed line in Figure 1.1 connects processors to exporters. The line is dashed because the exact nature of these two activities is difficult to discern. That is, processors are often exporters. The other arrows depict tangible market transactions. The final pathway in Figure 1.1 is the double-lined arrow highlighting the dominant trajectory of money flowing from the export market back to the villages. It is this income stream that is of the greatest importance to the role of exports in the West African economy.

## B. Employment and Income Multipliers

Figure 1.2 shows all of the participants in the value chain except the final consumer (say a foreign buyer). Explanation of the multiplier is best understood if we follow the expenditures of this consumer to acquire shea nuts as that money works its way to various participants in the value chain who then, in order to carry out their function, must purchase a range of goods and services from others in West Africa (or, perhaps import certain items into West Africa). This subsequent spending on wages and salaries, on gasoline, on benches, on sacks and other packaging, on labels for retail sales, on lawyers and credit, on telephone calls, on tires and various bribes along the highway, is precisely the “multiplier effect” of sales to the final consumer—of which the export market is the most important. Figure 1.2 offers a graphical depiction of this process. Each shaded box contains firms or individuals who may provide goods or services to the box above it. The multiplier captures the idea that those firms or individuals will then purchase other goods and services, thereby continuing to move their original income through the local economy.

Figure 1.2: Tracing the multipliers



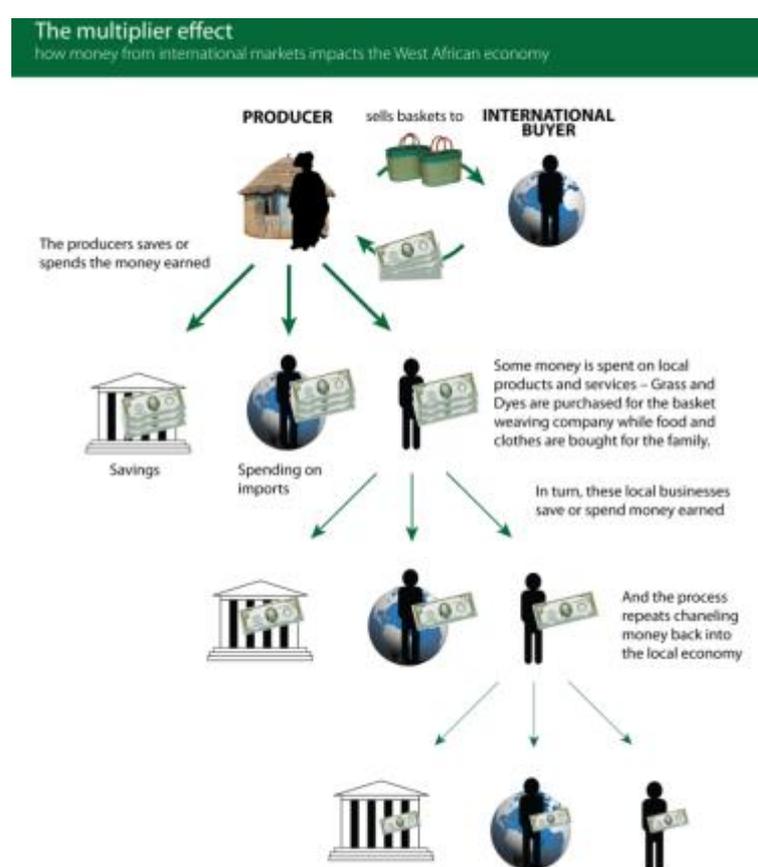
There are two multipliers of particular interest: the employment multiplier and the regional income multiplier. The mathematical derivation of these multipliers is shown in Appendices I and II. In Table 1.1 we see a formal description of each type of multiplier. These basic ideas will be elaborated in the specific context of each sector.

**Table 1.1: The employment and income multipliers**

Type of Multiplier	What it Measures
<b>Employment Multiplier</b>	Indicates that for every dollar of sales of the sector under study, a certain number of jobs are created. An employment multiplier of 0.05 indicates that for every \$100 of output of a sector (wood, baskets, cashews, shea) 5 jobs are made possible. This number of jobs <i>includes</i> those in the sector under study, as well as related jobs elsewhere.
<b>Regional Income Multiplier</b>	Indicates that for every dollar of sales of the sector under study, this much household income is created in the local economy. A regional income multiplier of 1.3 indicates that sales of \$100 from a sector of interest (wood, baskets, cashews, shea), an additional \$30 of household income will be created in the local economy.

It is important to keep in mind several aspects of the multipliers in Table 1.1. First, the value for the employment multipliers depends on the nature of the production process of the industry under study. If a product has many steps involving a number of different skills, the creation and eventual sale of that product will give rise to a larger number of jobs—have a larger employment multiplier—than if it is a rather simple manufacturing process involving very few people. Second, if the industry is highly mechanized then there will be few people attending to the various steps of production and the employment multiplier will be lower than if the industry is more labor intensive. Third, if many of the necessary inputs to the industry (the sector) are purchased locally, and if those firms supplying the requisite inputs are highly mechanized then the employment multipliers will be lower than if those supply firms are highly labor intensive. Finally, if necessary inputs are imported into the local economy from elsewhere (say, imported from abroad) then the employment multipliers will be lower than if those inputs are locally supplied.

**Figure 1.3: The multiplier effect**



The same logic applies to the regional income multiplier. When products are sold this brings income into the firm. Some of that income will be spent to acquire necessary productive inputs—see the previous paragraph; some will be paid to workers as wages and salaries; and, some will be retained by the owner of the firm as household income. The regional income multiplier reveals the effects of subsequent rounds of spending by those who receive this initial household income. If most of those earnings are spent locally then the regional income multiplier will be larger than if that household income is devoted to items from elsewhere and “imported” into the local (regional) economy.

## 2. The Multipliers

### A. The Basket Sector

The basket sector in Ghana is a traditional handcraft activity concentrated in the dry areas of the Upper East region around Bolgatanga. Baskets are produced in other regions as well—with each area having its distinct colors and designs. The Bolgatanga Basket Weavers Cooperative Club includes approximately 1,000 members. Women dominate the production of baskets and other woven products (hats, fans, mats), while men dominate marketing and transportation activities. The production from this region goes to other parts of Ghana as well as to Europe and the United States (Antwi-Asare and Rahaman, 2010).

The employment and income multipliers for basket making in Bolgatanga are shown in Table 2.1.

Figure 2.1: The flow of Bolga baskets



Table 2.1: Multipliers for baskets in Bolgatanga

Type of Multiplier	What it Measures	Multiplier
<b>Employment Multiplier</b>	For \$1,000 of sales of baskets in Bolgatanga the multiplier indicates that 160 jobs will be created in the local economy.	0.016
<b>Regional Income Multiplier</b>	For \$1.00 of income from the sale of baskets by women producers, an additional \$0.58 of household income will be created in the local economy.	1.58

Source: Antwi-Asare and Rahaman, 2010.

It is difficult to generalize about the employment multiplier, but the regional income multiplier is fairly typical of remote rural regions of Africa (Bell and Hazell, 1982; Delgado, Hopkins, and Kelly, 1998; Haggblade, Hammer, and Hazell, 1989, 1991).

## B. The Wood Sector

The wood sector in Ghana represented the fourth largest source of foreign exchange during several recent periods (2003, 2006). Data for 2003 suggest that wood carving and furniture making accounted for 39,000 jobs, of which 7,000 were located in the Ashanti region. A much large number of people are employed in the “informal” activities of the sector. While the harvesting of wood occurs throughout the forested regions in the lower-middle portions of the country (Brong-Ahafo, Ashanti, Eastern regions), the bulk of the carving occurs in the Kumasi suburb of Ahwia, and the majority of furniture making occurs in the Kumasi suburb of Anloga. The estimated employment and regional income multipliers for the wood sector in Ashanti are presented in Table 2.2.

**Table 2.2: Multipliers for the wood sector in Ashanti Region**

Type of Multiplier	What it Measures	Multiplier
<b>Employment Multiplier</b>	For \$1,000 of sales of wood products in the Ashanti region, 100 jobs will be created in the region.	0.054
<b>Regional Income Multiplier</b>	For \$1.00 of income from the sale of wood products from the Ashanti region, an <i>additional</i> \$1.15 of household income will be created in the local economy.	2.15

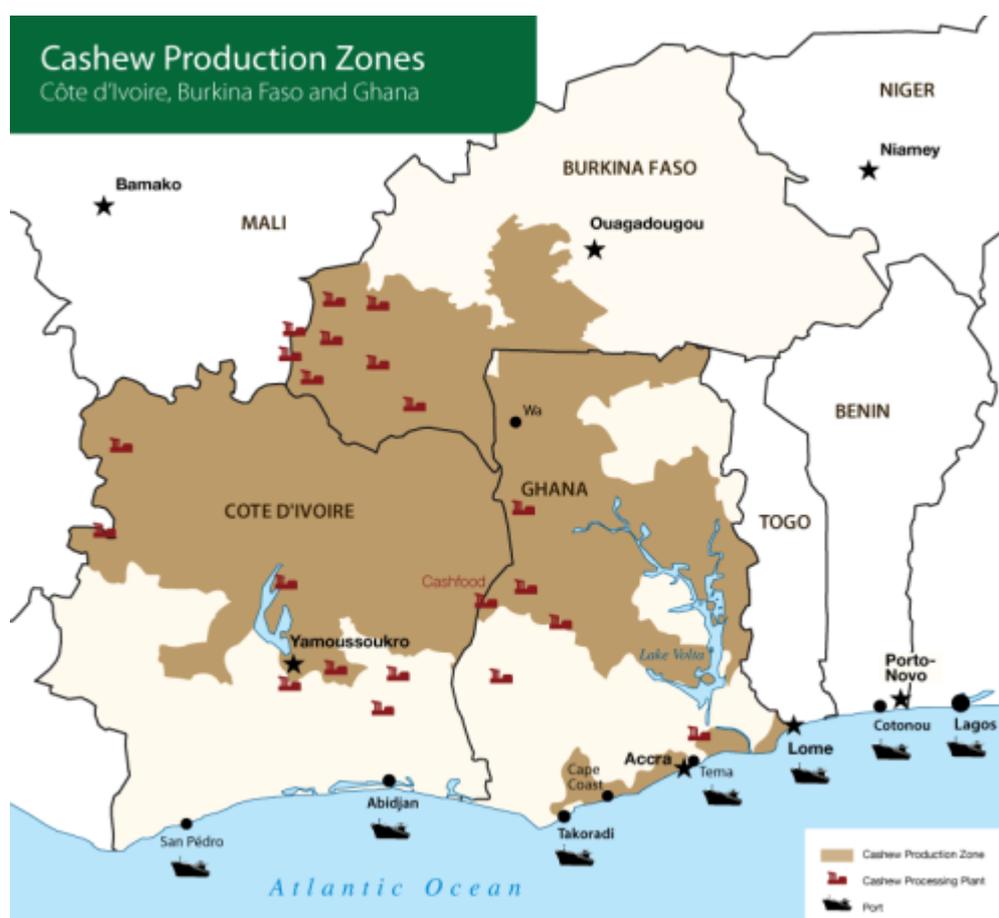
Source: Antwi-Asare and Rahaman, 2010.

## C. The Cashew Sector

Cashew is an important agro-forestry crop in West Africa (Table 2.3). For this study, the research was focused specifically on cashews in Ghana.

The cultivation of cashew in Ghana is practiced by approximately 60,000 small farmers on an area of about 60,000 hectares. Both numbers are often difficult to verify because, as with all tree crops, there are no annual data on new plantings or area harvested. Accurate production figures are likewise difficult to obtain. The Ghana Shippers' Authority (formerly Ghana Shippers' Council) reports a solid upward trend in cashew exports (Table 2.4) but it must be kept in mind that there are large quantities of raw cashew nuts entering Ghana from Côte d'Ivoire so the data in Table 2.4 cannot be correlated with production in Ghana. Given the continuing difficulties in Côte d'Ivoire, it is possible that the vast majority of increased exports reported in Table 2.4 are in fact cross-border shipments coming from Côte d'Ivoire to Tema.

Figure 2.2: Cashew production zones in Côte d'Ivoire, Burkina Faso and Ghana



**Table 2.3: Cashews in West Africa**

	Raw nut production MT*	Number of processors		Processing capacity MT	MT processed in 2006	Avg. kernel price/kg (\$) supermarkets
		Large	Small			
<b>Benin</b>	45,000	1	5	1,730	30-50	\$13.34
<b>Burkina Faso</b>	< 15,000	1	2	2,000	500	\$12.01
<b>Côte d'Ivoire</b>	200,000	2	3	10,100	> 5,000	\$20.22
<b>Ghana</b>	15,000	0	10	530	350	\$20.70
<b>The Gambia</b>	< 5,000	0	1	-	-	\$20.37
<b>Guinea-Bissau</b>	100,000	3	26	4,080	-	\$12.18
<b>Mali</b>	< 5,000	0	0	-	-	\$9.96
<b>Nigeria</b>	70,000	6	3	23,600	14,750	\$17.69
<b>Senegal</b>	15,000	0	15	350	-	\$16.94
<b>Togo</b>	< 5,000	0	1	80	80	\$16.36
<b>Total</b>	<b>&lt; 475,000</b>	<b>13</b>	<b>66</b>	<b>42,470</b>		<b>\$15.98</b>

\* No official statistics exist for raw nut production in any of these countries. These numbers are estimates based on recent studies and interviews with traders.

USAID's West Africa Trade Hub, 2007.

Despite these data problems, it is clear that cashew farming is an important contributor to agricultural production and employment in Ghana. Approximately 60% of the formal and informal work force is engaged in agriculture and the sector accounts for about 36% of total GDP (Kwadzo and Kuwornu, 2010). Throughout the 1970s and 1980s, agriculture contributed over 60% of total export earnings. The decline in cocoa exports in recent years has reduced that share over the past several decades.

**Table 2.4: Recent trends in Ghana cashew exports**

<b>Table 1: Ghana Cashew Export 2003 - 2006 Year</b>	<b>Quantity of Cashew Exports (MT)</b>	<b>Total Ghana Exports (US\$ Millions)</b>	<b>Value of Cashew Exports (US\$ Millions)</b>	<b>Average FOB Tema Price (US\$/MT)</b>
Yr 2003	31,335	3,101.44	15.67	500
Yr 2004	38,181	3,486.94	21.00	550
Yr 2005	40,992	3,868.59	28.69	700
Yr 2006	47,962	5,062.78	23.98	500

Source: Ghana Shippers Council; World Bank, 2008.

Table 2.5 shows the employment and income multipliers for cashew production in Central Ghana.

**Table 2.5: Cashew multipliers**

Type of Multiplier	What it Measures	Multiplier
<b>Employment Multiplier</b>	For \$1,000 in cashew sales by farmers, 120 jobs are created in the central Ghana region.	0.12
<b>Regional Income Multiplier</b>	For \$1.00 of farm income from the sale of cashews, an additional \$1.43 of household income will be created in the local economy.	2.43

Source: Kwadzo and Kuwornu, 2010.

The multipliers in Table 2.5 can be used to demonstrate the profound economic loss attributable to the absence of large-scale cashew processing in West Africa.<sup>3</sup>

While approximately 93-95% of cashew production in West Africa is exported as raw kernels, there is some local processing carried on by small cooperatives, and there are several commercial processors operating in the region. The small scale of this local processing meant that its economic effects would not be detectable through normal multiplier calculations so some improvisation was required. The purpose of this exercise is to derive a basis for estimating the possible economic effects—both jobs and incomes—in West Africa from efforts to augment local processing of cashews. The possible gains that might arise from the expansion of processing capacity in West Africa are significant.

In order to derive the basis for these estimates, it was necessary to collect data from a few of the commercial cashew processors operating in West Africa to determine the nature and extent of their costs. However, this would require access to proprietary information. To obtain the necessary data without compromising the confidentiality of the few firms in the sample, a questionnaire format was developed using a *numéraire*.<sup>4</sup> A discussion of the sampling method will reveal important insights into the nature of economic benefits arising from processing activities. That is, every dollar of expenditure by a processing firm represents income to an individual or a company in West Africa. Looked at in this way, a *cost* to a processing firm is income to someone.

In the survey, commercial processors were asked to set the total cost of raw cashew nuts purchased from farmers in 2009 equal to 100. This becomes a *numéraire*. Then they were asked to consider all of their other costs, by category, and to indicate the ratio of those costs to the *numéraire* (total cost of cashew purchases). Firm accountants then compared their 2009 processing costs (by category) to their known cost of purchasing raw nuts. Their expenses were therefore in terms of these costs in relation to the *numéraire* (100). For instance, if they spent \$500,000 to purchase raw cashew nuts, and they spent \$600,000 on labor costs, they would report costs of labor as 1.2. If their transport costs were \$300,000 they would report 0.60 for that category. In this way an estimate of the various categories of their processing costs could be constructed – without the need to know confidential information about their businesses.

3 There are a number of very small local cooperatives engaged in processing but data limitations preclude the detailed calculations to be pursued here.

4 A *numéraire* is a basic standard by which values are measured.

Recall that our interest here is not in a single firm but in the jobs and household incomes generated by the processing of cashew. Table 2.6 represents an average for the two firms interviewed.

**Table 2.6: Expenditures by commercial cashew processors, 2009**

For \$1,000 nut purchases	Amount	Income to:
Commissions	\$105	Buyers
Haulage	\$40	Transport firms
Wages	\$595	Hourly workers
Mgmt and supervision	\$122	Managers and supervisors
Supplies	\$650	Suppliers
Testing	\$8	Laboratories
Miscellaneous	\$160	
Conveyance	\$48	Conveyance firms
Telecommunications	\$20	Telecom firms
Postage	\$60	Firms and government
Meetings	\$1	Organizers and hosts
Processing leases	\$105	Agents
Warehousing	\$25	Warehouses
Office expenses	\$35	Supply firms
Depreciation	\$125	
<b>TOTAL</b>	<b>\$2,099</b>	

Table 2.6 shows total expenditures in West Africa of \$3,099. Of that amount, \$1,000 goes to cashew farmers, and the remaining \$2,099 goes to other firms as well as to the workers who process the cashews. The export value of these processed cashews is obviously greater than the \$3,099 of costs embodied in Table 2.6. How much greater is not of any great interest here, though it will show up in national statistics on total export values. What matters is how much money remains in West Africa from the processing of raw cashew nuts.

The expenditures in Table 2.6 are of three types. Some of those expenditures represent direct payments to households, which are considered to be “direct income generating” expenditures. A second category is called “indirect income generating,” which tend to be services purchased by the processors in which local hired labor is an important component. The third category is for materials and supplies in which local household incomes are a minor part of total costs to the processors. The first category—“direct income generating”—is of immediate interest. These are separated out of Table 2.6 and shown in Table 2.7.

**Table 2.7: Specific labor costs of cashew processing**

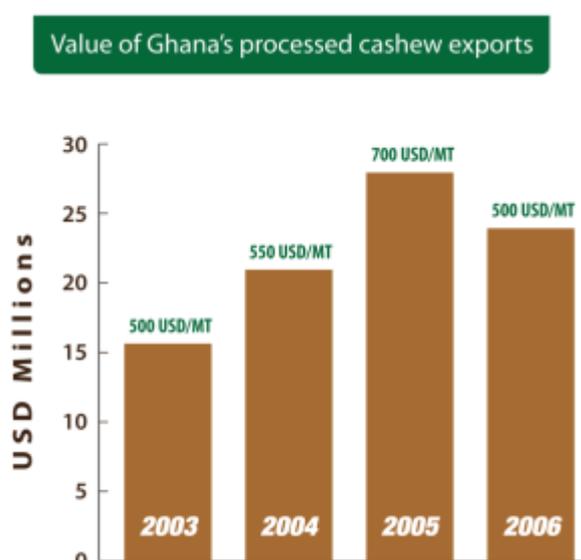
Direct Income Generating	Per \$1,000	Recipients
Commissions	\$105	Buyers
Wages	\$595	Workers
Mgt & Supervision	\$122	Managers & Supervisors
<b>Sub Total</b>	<b>\$822</b>	

The implication of the data in Table 2.7 lies in the fact that for every \$1,000 of cashews sold to processors, \$822 was spent by these processors on commissions, wages, and costs for management and supervision. This represents direct household income. Knowing this, we can apply the regional income multiplier of 2.43 in Table 2.5 to infer that every \$1.00 of household income earned in the processing sector will give rise to an *additional* \$1.43 of household income in the local economy.

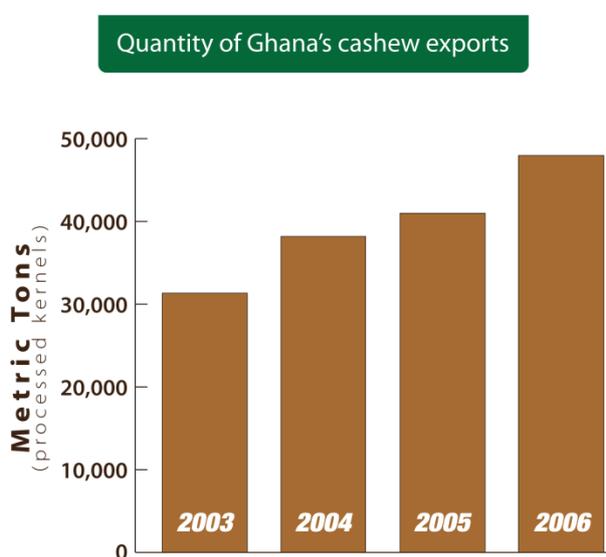
Extending the analysis further, field research in February 2010 suggests that the average farm-gate price of raw cashew nuts was GHC 0.44 per kilogram (GHC 440 per MT) (Kwadzo and Kuwornu, 2010). This is equivalent to \$0.31 per kg. Thus, \$1,000 of expenditures would bring approximately 3.23 MT of raw cashew nuts to a processing facility. The labor costs of this quantity would be \$822, which would give rise to an additional household income of \$1,175.

In 2006, total cashew exports are estimated to have been 47,962 MT, approximately 95% of which was exported without processing. If 75% of that quantity were to undergo processing prior to export, it would have brought 35,971 MT into processing facilities. We know from above that for every 3.23 MT there is \$822 of direct household income,<sup>5</sup> and an additional multiplier effect of \$1,175—for a total of \$1,997.

**Figure 2.3: Value of Ghana's processed cashew exports**



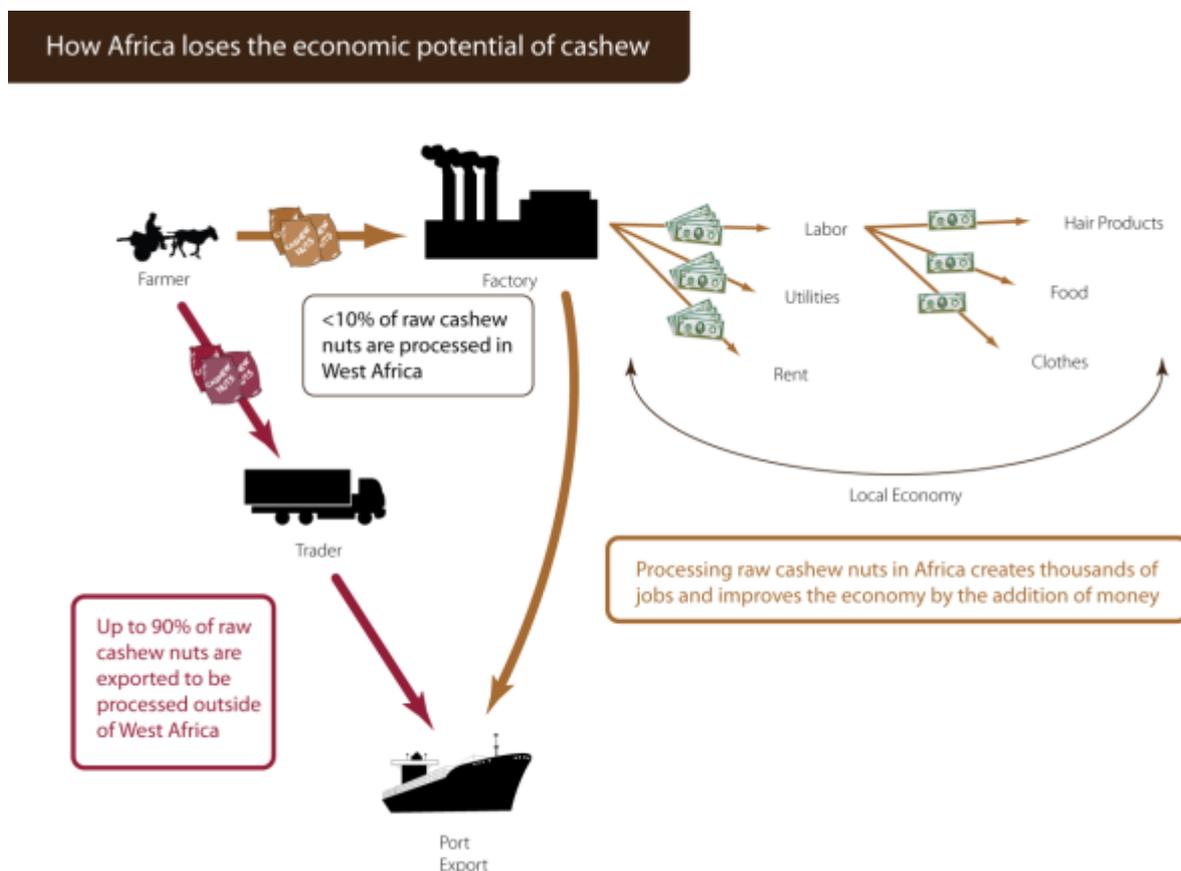
**Figure 2.4: Quantity of Ghana's cashew exports**



<sup>5</sup> Christian Dahm, of the African Cashew Alliance and the USAID West Africa Trade Hub indicates that an industry norm is that 300 workers can process 1,000 MT per year—or 3.33 MT per worker. It is also reported that cutters in a processing facility can receive annual incomes of approximately \$1,333. We see that approaching this estimation from two different perspectives yields quite consistent estimates.

The processing of this additional 35,971 MT of cashew would therefore create new income of \$22,240,589 [ $35,971 \times 3.23 = 11,137$ , and  $(11,137)(\$1,997) = \$22,240,589$ ]. It may be noticed that being able to process just  $\frac{3}{4}$  of the 2006 cashew crop would have produced new household incomes that are almost identical to the *entire export value* of raw cashew nuts in 2006 (see Table 2.4).

Figure 2.5: How Africa loses the economic potential of cashew

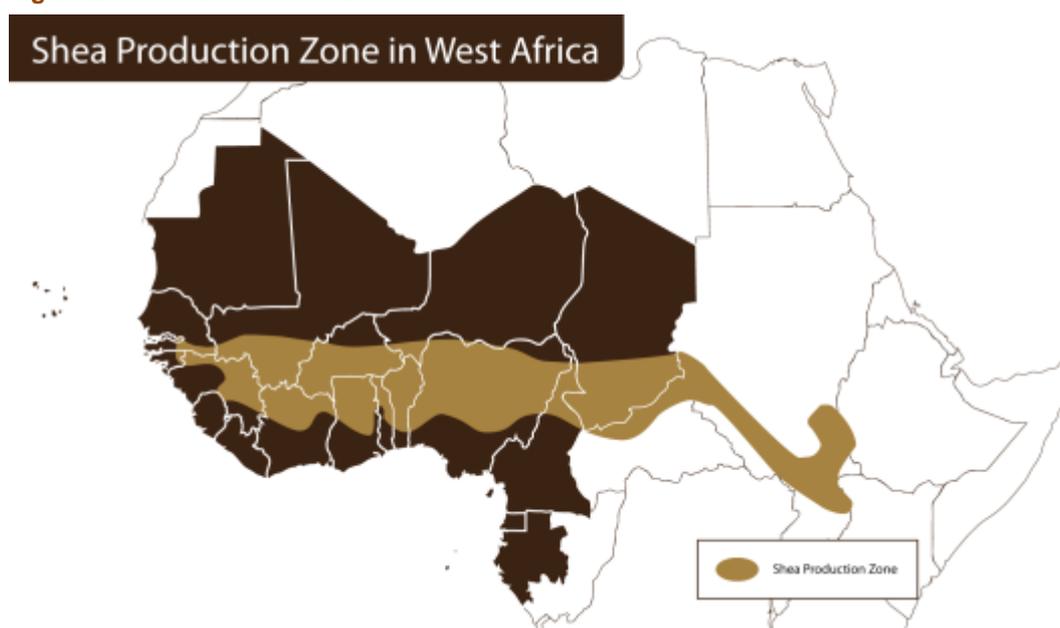


## D. The Shea Sector

The importance of shea production in West Africa is found in the fact that shea production is an activity engaged in almost exclusively by women. Since women control the collection of shea fruits across the vast expanses of West Africa’s shea savanna, they control the sale of shea kernels to local traders, or if they decide to convert some shea kernels into butter, women perform the arduous task of processing nuts into butter for their own use, or for sale to exporters (who will likely further refine the butter).<sup>6</sup> Shea produces “women’s income.” According to a recent paper:

African shea butter is becoming increasingly familiar in the West. This vegetal oil has emerged from obscurity to prominence as a favorite ingredient in natural lines of cosmetics. Over the past fifteen years, shea – or *karité* as it is known in French – has become the focus of many development initiatives because it is one of the few economic commodities in the region under the control of women. Part of a *filière féminine* (a female commodity chain), shea has long been collected, processed and traded by women. The current global market demand extends the shea commodity chain, linking African women producers to Western female consumers (Elias and Carney, 2007, p. 37).

Figure 2.6: The African Shea Belt



(Source: Elias and Carney, 2007, p. 38.)

The shea tree (*Vitellaria paradoxa*) is found in a long narrow swath approximately 600 km wide and 5,000 km long across northern Sub-Saharan Africa, encompassing 20 countries from Senegal in the west to Sudan and Uganda (and a small corner of Ethiopia) in the east (Figure 2.6).<sup>7</sup> The shea fruit has a variety of uses—fruit pulp, the nut is used for eating,

<sup>6</sup> The process of making butter, by hand, from raw shea nuts is not something to be undertaken lightly. It is estimated that approximately 50 kg of shea nuts requires 29 hours of labor to yield 4 kg of butter (FAO, 2004).

<sup>7</sup> Subspecies *paradoxa* occurs in the western range of the shea belt covering 20 countries: Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of Congo, Ethiopia, Gambia, Ghana, Guinea, Guinea

extraction of cooking oil, and for the manufacture of edible butter and cosmetics. The shea belt is said to contain over 500 million trees across this semi-arid strip of Africa. In West Africa, the primary export market for shea butter is as a substitute for cocoa butter—Cocoa Butter Equivalent (CBE)—in the making of chocolate and various confections. A second export market—much smaller in volume but not in value—is for shea butter used in cosmetics. A third export market is for pharmaceuticals and edible fats (Ferris, et al., 2001).

Calculation of the regional income multiplier proceeds as for basket making in Bolgatanga, wood products in Ashanti region, and cashews. The regional income multiplier for shea production in Koulikoro, Mali is shown in Table 2.8.

**Table 2.8: Regional income multiplier for shea in Koulikoro**

Type of Multiplier	What it Measures	Multiplier
<b>Regional Income Multiplier</b>	For \$1.00 of farm income from the sale of shea nuts in Mali, an additional \$0.58 of household income will be created in the local economy.	1.58

This multiplier value is similar to that obtained for basket production in Bolgatanga. Given the nature of basket making and the production of shea nuts, this is to be expected. Both activities represent part-time activities for farm women taking place in remote rural economies with considerable “leakage”, by which we mean these economies are quite “open” in terms of economic activity. In practical terms, this means that the bulk of items that might be purchased with the income earned from selling baskets or shea nuts must be imported into Bolgatanga or Koulikoro and hence less of this spending remains in the local economy to stimulate yet further sales (and household income).

The value chain for shea is somewhat more diverse than for cashew and so it is difficult, with the data at hand, to capture the full diversity of that activity. Data for the artisanal production of shea butter for export was not available; data for the industrial extraction of shea fat was and that is reported here. As with cashew, commercial processors were asked to estimate processing costs per \$1,000 of purchases of shea nuts from farmers. Table 2.9 depicts the results of this allocation.

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Bissau, Mali, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo and Uganda. Subspecies *nilotica* occupies the eastern range and is found in four countries: Democratic Republic of Congo, Ethiopia, Sudan, and Uganda (FAO, 2004, pp. 52-53).

**Table 2.9: Processor expenditures per \$1,000 of shea purchases**

For \$1,000	Amount	Income to:
Commissions	\$ 8	Buyers
Haulage	\$ 71	Transport firms
Wages	\$ 66	Hourly workers
Management & Supervision	\$ 16	Managers & supervisors
Supplies	\$ 6	Suppliers
Forwarding	\$ 14	Agents
Testing	\$ 5	Laboratories
Miscellaneous	\$189	
Telecoms	\$ 7	Telecoms firms
Postage	\$ 5	Firms and government
Meetings	\$ 10	Organizers and hosts
Processing Leases	\$ 12	Building owners
Warehousing	\$ 24	Warehouses
Office Expenses	\$ 4	Supply firms
Depreciation	\$ 49	
Total	\$486	

The categories are re-grouped in Table 2.10 to highlight those costs that are direct contributors to household income.

**Table 2.10: Industrial shea processors' expenditures to households**

Direct Income Generating		
Commissions	\$8	Buyers
Wages	\$66	Workers
Mgt & Supervision	\$16	Managers & Supervisors
Sub Total	\$90	

Here we see that only \$90 of labor costs is entailed in the processing of \$1,000 of shea purchases from farm women. This household income, in conjunction with a regional income multiplier of 1.58, means that total household income of \$142 arises from the processing of \$1,000 of shea purchased from farm women—\$90 of direct household income, plus \$52 of indirect income.

## E. General Summary

Table 2.11 summarizes the various multiplier values.

**Table 2.11: Summary of the multiplier values**

SECTOR	FOR \$1,000 OF NEW SALES	NEW JOBS CREATED	ADDITIONAL HOUSEHOLD INCOMES IN LOCAL ECONOMY
<b>BASKETS</b>	\$1,000 of household income for basket producers	160 new jobs in Ghana	\$580 new income in the Upper East Region
<b>CASHEW</b>	\$1,000 of household income for cashew farmers	120 new jobs in Ghana	\$1,430 new income in central Ghana
<b>SHEA</b>	\$1,000 of household income for shea producers		\$580 new income in shea producing region
<b>WOODCRAFTS</b>	\$1,000 of household income to wood producers	100 new jobs created in Ghana	\$1,150 new income in Ashanti Region

When considering cashew and shea it is often helpful to think in terms of raw nuts purchased from farmers. Tables 2.12 and 2.13 depict these relationships for cashew and shea.

**Table 2.12: Multiplier values per MT of raw cashew nuts**

Cashew farming	For 1 MT of raw cashew nuts purchased from farmers (at \$310/MT) →	\$310 of farm income is created →	37 jobs are supported in Ghana →	\$443 of additional household income is created in the regional economy
Cashew processing	For 1 MT of raw cashew nuts processed in West Africa →	0.3 jobs exist in processing →	\$254 is paid to workers to process this 1 MT →	\$363 of additional household income is created in the regional economy
The Losses Clarified	For every MT of raw cashew nuts exported WITHOUT being processed →	0.3 jobs are lost →	\$254 of worker income is lost →	\$363 of additional household income is lost

**Table 2.13: Multiplier values per MT of raw shea**

<b>Shea farming</b>	For 1 MT of shea nuts purchased from farmers (at \$220/MT) →	\$220 of farm income is created →		\$128 of additional household income is created in the regional economy
<b>Shea fat extraction</b>	For 1 MT of shea processed in West Africa →		\$20 is paid to workers to process this 1 MT →	\$29 of additional household income is created in the regional economy

### 3. Challenges and Opportunities for Increased Exports from West Africa

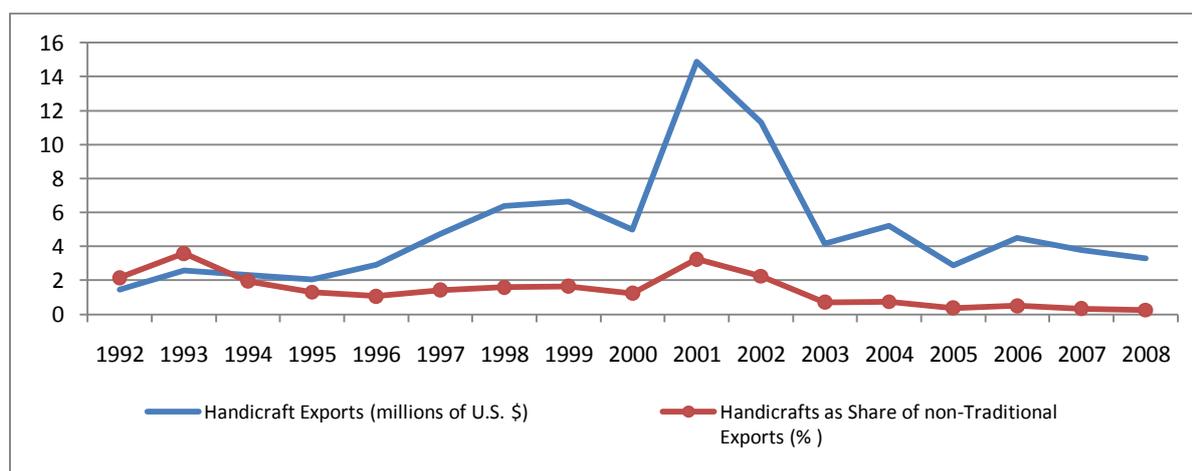
#### A. Handcrafts: Baskets and Wood Products

Several world events have brought hard times to the handcrafts sector. Vietnam’s entry into “Bolga” style basket making has taken away a large share of the West African export market. Buyers from large, retail chains—Cost Plus World Market, Pier 1, Target—are constantly seeking products that are responsive to trends in consumer preferences at the lowest possible prices. One year buyers will order hundreds of thousands of a particular cluster of products, but then orders will fall off the following year due to market saturation or opportunities for lower-cost production elsewhere.

This presents West African producers with two options: (1) stay apace with changing consumer preferences through continual introduction of new and innovative products; (2) reduce costs in order to stave off competition from elsewhere. This second option seems unlikely to succeed since West Africa continues to be a high-cost source for items moved by ship to Europe and the U.S. Part of this cost disadvantage is attributable to the absence of scale economies. Africa is some distance from the major shipping lanes of world commerce. But a major part of this cost disadvantage is due to political and economic problems in the economies of West Africa. This theme is explored below.

The recent history of handcraft exports is depicted in Figure 3.1. As we see there, the year 2001 was the peak of handcraft exports.

Figure 3.1: Time trend of the handcraft sector in Ghana



Source: Antwi-Asare and Rahaman, 2010.

As discussed previously, the promise of higher prices appears to be insufficient inducement for producers to expand production. Other barriers include the high cost of—and the general unavailability of—credit. Basket makers face a shortage of straw, and problems in moving their finished product to market.

Wood producers are stifled by poor organization in the sector, by the absence of working capital, by technological obsolescence, and by the lack of creativity and imagination among the artisans. Some experts suggest that the sector also lacks appropriate facilities and an outlook that fosters development and growth (Antwi-Asare and Rahaman, 2010).

Transportation services loom as an important barrier to increased exports.

## B. Tree Crops: Cashew and Shea

Cashew farmers report being seriously constrained by low (and fluctuating) prices, the frequency of bush fires, high cost of inputs, “exploitation” by cashew traders/exporters, the absence of processing facilities (for both cashew nuts and apples), and relatively bad roads from farms to all-weather roads (Kwadzo and Kuwornu, 2010). The market for cashews is indeed a rather contentious affair. Often, when traders enter into forward contracts with cashew farmers, farmers will renege to sell to others at a slightly higher price. This practice is evidence of agricultural markets that remain unsophisticated. And it points to a pressing need throughout West Africa.

For shea, Tables 3.1 and 3.2 show various production and export statistics for countries in West Africa. The study focused on Burkina Faso, Ghana, and Mali.

**Table 3.1: Shea Production, Consumption, and Exports from West Africa, 2004 (MT)**

Country	Est. Total Potential Production <sup>4</sup>	Est. Actual Collection	Estimated Consumption	Total Exports	Export as Shea kernels	Export as Shea Butter
Benin	80,000	50,000 <sup>5</sup>	14,900	35,100	35,000	100
Burkina Faso	150,000	75,000	35,000	40,000	37,000	3,000
Cote d'Ivoire	150,000	40,000	15,000	25,000	15,000	10,000
Ghana	200,000	130,000	70,000	60,000	45,000	15,000
Mali	250,000	150,000	97,000	53,000	50,000	3,000
Nigeria	250,000	100,000	80,000 <sup>6</sup>	20,000	20,000	0
Togo	50,000	40,000	10,000	30,000	15,000	15,000
<b>WATH Major Exporters Sub-total</b>	<b>1,130,000</b>	<b>585,000</b>	<b>321,900</b>	<b>263,100</b>	<b>217,000</b>	<b>46,100</b>
Gambia	100	0	0	0	0	0
Guinea Conakry	25,000	5,000	4,500	500	450	50
Guinea-Bissau	1,000	100	100	0	0	0
Niger	5,000	5,000	4,000	1,000	0	1,000 <sup>7</sup>
Senegal	10,000	500	490	10	0	10
Sierra Leone	100	0	0	0	0	0
Cameroon	30,000	5,000	2,500	2,500	2,500	0
Chad	10,000	2,000	2,000	0	0	0
<b>WATH Minor Exporters Sub-total</b>	<b>81,200</b>	<b>17,600</b>	<b>13,590</b>	<b>4,010</b>	<b>2,950</b>	<b>1,060</b>
Ethiopia	1,000	100	100	0	0	0
Sudan	100,000	10,000	9,800	200	0	200
Uganda	70,000	6,000	5,900	100	0	100
Central African Republic (CAR)	15,000	2,500	2,500	0	0	0
Dem. Republic of Congo (DRC)	5,000	750	750	0	0	0
<b>Not WATH Sub-total</b>	<b>191,000</b>	<b>19,350</b>	<b>19,050</b>	<b>300</b>	<b>0</b>	<b>300</b>

Source: Lovett, 2004.

**Table 3.2: Shea Production, Consumption, and Exports from West Africa, 2008 (MT)**

Country (major stearin producers only: <i>Vitellaria paradoxa</i> subsp. <i>paradoxa</i> )	Potential maximum production for 2008 (t)	Estimated total maximum harvest 2008 (t)	Estimated local / intra-regional consumption (t)	Estimated total exports as sheanuts (t)	Est. shea butter converted pre-export (kernel equivalent of country crop* t)	Estimated total shea export (t)
<b>Benin**</b>	80,000	50,000	30,000	15,000	5,000	20,000
<b>Burkina Faso***</b>	150,000	100,000	30,000	45,000	25,000	70,000
<b>Côte d'Ivoire</b>	120,000	60,000	30,000	25,000	5,000	30,000
<b>Ghana</b>	150,000	100,000	50,000	25,000	25,000	50,000
<b>Guinée-Conakry</b>	30,000	10,000	3,000	6,000	1,000	7,000
<b>Mali</b>	200,000	120,000	50,000	60,000	10,000	70,000
<b>Nigeria</b>	180,000	90,000	50,000	30,000	10,000	40,000
<b>Togo</b>	50,000	30,000	15,000	10,000	5,000	15,000
	<b>960,000</b>	<b>560,000</b>	<b>258,000</b>	<b>216,000</b>	<b>86,000</b>	<b>302,000</b>

\*All figures given as dry kernel equivalent, i.e. 1 ton butter exported requires 3 tons of sheanuts and so butter export is given as kernel (sheanut) equivalent  
\*\*Figures for Benin are given as an estimate exclusive of imports from Nigeria  
\*\*\*Calculation of figures for conversion into butter where factory country is different from origin is confounded by customs data

Source: Lovett, 2009.

Careful examination of these tables reveals a surprising statistic: only a fraction of total West African shea nut production is actually collected and moved to market. The research showed a significant shortage of labor to collect the shea nuts. As it happens, the shea fruit ripens and falls to the ground during the rainy season—the very time of year during which women are working 8-10 hours a day to weed their fields and to plant their crops. The shea trees are widely scattered. The standard practice is for women to gather up the fallen fruits and leave them piled beneath the shea trees on the way to their various fields. In the evening, on their way home, women will collect the nuts and carry them back to their compounds. The nuts are stored there until the planting schedule allows proper drying and preparation. Meanwhile, many of the nuts form mildew and are ruined. It is also said that bats carry off a large number of fruits before they can be carried to the compounds. Fear of snake bites also deters collection. Finally, labor shortages have forced many women to abandon their more distant fields and to cultivate those closer to their home compound. If true, this means that women are not getting out into the shea savanna as much as they did in former times.

The research conducted does not explain this low rate of collection of shea production. But if a greater share of the annual fruit/nut production could be collected and properly dried, household incomes could be significantly increased.

One final comment concerns the transport sector in West Africa. It is well known that transport costs in West Africa are approximately double those found in Western Europe. When bribes and the cost of enforced delays are added in, the cost burden for nuts—commodities that have a high weight-to-value ratio—represents a serious impediment to enhanced exports. This fact tends to suppress the offer price to farmers and therefore to discourage production. Or, as with shea nuts, low prices discourage collection. Estimates suggest that a 10% reduction in transport costs along the main corridors of West Africa could produce savings that would allow a 2-3% increase in farm-gate prices of cashew, and a 7-8% increase in farm-gate prices of shea (Bromley and Foltz, 2010).

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## **APPENDICES**

## APPENDIX I: The Regional Income Multiplier

Consider a rural economy in which gross output of tradable commodities ( $T$ ) is constrained by natural resources and available technology such that total tradable commodities are limited to ( $\bar{T}$ ). This will be a fixed-price model in which we assume that non-tradable output ( $N$ )—by which “non-tradable means that  $N$  is consumed or sold entirely within the regional economy—is perfectly elastic in supply; local output levels of  $N$  are entirely determined by local demand (Haggblade, et al.,1991).

This local demand for non-tradables (equation 2 below) comes from households ( $H_n$ ), from regional firms as “intermediate goods” ( $D_n$ ), from government expenditures ( $G_n$ ), and the demand of regional firms for investments ( $J_n$ ). The following six equations depict the system under consideration.

$$T = \bar{T} \quad (1)$$

$$N = H_n + D_n + \bar{G}_n + \bar{J}_n \quad (2)$$

$$H_n = \gamma_n + \beta_n(Y - L) \quad (3)$$

$$D_n = a_{nt}\bar{T} + a_{nm}N \quad (4)$$

$$L = sY \quad (5)$$

$$Y = v_nN + v_t\bar{T} \quad (6)$$

Next some assumptions about household consumption expenditures are necessary. I assume that household expenditures *on non-tradables* increase linearly with income ( $Y$ ). The extent of this relationship will depend on “leakage” ( $L$ ) of income going to savings and taxes. Moreover, we need to account for the marginal proportion of total expenditures devoted to the purchase of non-tradables ( $\beta_n$ ) and the intercept ( $\gamma_n$ ) of the consumption function (equation 3). Notice from equation (5) that leakages are a fixed proportion ( $s$ ) of income ( $Y$ ).

I assume here, along with Haggblade, et al. (1991), that intermediate demand for non-tradables ( $D_n$ ) is a fixed proportion of sectoral gross output. This is the familiar “Leontief technology” assumption and it implies that intermediate sales from sector  $i$  to sector  $j$  ( $a_{ij}$ ) do not vary with total output of either sector. The approach takes government expenditures ( $G_n = \bar{G}_n$ ), and investment expenditures ( $J_n = \bar{J}_n$ ), as exogenous. The final assumption considers household income ( $Y$ ) to be a fixed share ( $v_j$ ) of gross output in each of the two sectors—tradables ( $T$ ) and non-tradables ( $N$ ). Here,  $j = N, T$ . As local consumption varies, exports adjust to equate regional supply and demand.

Equations (1-6) can be expressed in matrix form as:

$$\begin{pmatrix} 1 - a_m & -\beta(1-s) \\ -v_n & 1 \end{pmatrix} \begin{pmatrix} N \\ Y \end{pmatrix} = \begin{pmatrix} K_n + a_m \bar{T} \\ v_t \bar{T} \end{pmatrix} \quad (7)$$

Where  $K_n = \lambda_n + \bar{G}_n + \bar{J}_n$ . Solving for regional income (Y), yields equation (8).

$$Y = \frac{[(1 - a_m)v_t + a_m v_n] \bar{T} + v_n K_n}{1 - a_m - \beta_n v_n (1 - s)} \quad (8)$$

Equation (8) shows that total regional income is a function of the Leontief coefficients multiplied by the shares of gross output in both tradables and non-tradables, the tradable output, and non-tradable considerations being captured in  $K_n$  and  $\beta_n$ .

If we allow for technical change in agriculture or local manufacturing bringing forth an increase in output of tradables, the impact would be modeled by introducing a technology

coefficient  $\theta$ . Assume that  $\frac{\delta(\bar{T} v_t)}{\delta\theta}$  measures the direct change in regional income arising

from increased production of tradables, while  $\frac{dY}{d\theta}$  reflects the change in regional income arising from a change in technology. Haggblade, et al. (1991) then write the traditional value-added multiplier as:

$$M = \frac{\frac{dY}{d\theta}}{\frac{\delta(\bar{T} v_t)}{\delta\theta}} \quad (9)$$

which depicts the increase in regional value added given a one-unit increase in value added from tradable output. It will help to expand this expression (9) so that its relation to another source of increased regional income can be understood. Consider equation (10).

$$M = \frac{[(1 - a_m) \left(\frac{\delta v_t}{\delta\theta}\right) + v_n \left(\frac{\delta a_m}{\delta\theta}\right)] \left(\bar{T}\right) + [(1 - a_m)v_t + a_m v_n] \left(\frac{\delta \bar{T}}{\delta\theta}\right)}{[1 - a_m - \beta_n v_n (1 - s)] \left[v_t \frac{\delta \bar{T}}{\delta\theta} + \bar{T} \left(\frac{\delta v_t}{\delta\theta}\right)\right]} \quad (10)$$

Now consider the case in which the increase in output of tradable goods—cashews, shea, handcraft goods—does not alter the use of intermediate inputs *per unit of output*. We can think of such changes as shifting the production possibilities frontier for tradables outward from the origin. The reasons for this shift might be: (1) greater availability of credit that had previously restrained production of tradables; (2) relaxation of a constraint on labor supply in the tradables sector, or (3) strengthened demand for tradables elsewhere in the nation—or the rest of the world. Limiting ourselves to this modified model will, moreover, simplify the

empirical challenge. As it stands, the multiplier in equation (10) requires that 10 separate parameters be estimated:

$$a_m, a_n, v_n, v_t, s, \beta_n, \bar{T}, \frac{\delta a_m}{\delta \theta}, \frac{\delta \bar{T}}{\delta \theta}, \text{ and } \frac{\delta v_t}{\delta \theta}.$$

We can simplify data demands by introducing a few assumptions. If we assume, quite reasonably it seems, that both  $\frac{\delta a_m}{\delta \theta}$  and  $\frac{\delta v_t}{\delta \theta}$  equal zero then equation (10) reduces to:

$$M = \frac{1 - a_m + a_n \left( \frac{v_n}{v_t} \right)}{1 - a_m - \beta_n v_n (1 - s)} \quad (11)$$

And here we see that only 6 parameters require estimation. It may also be noticed that equation (11) can be re-written as the more intuitive:

$$M = \left( \frac{1}{v_t} \right) \left( \frac{dY}{d\bar{T}} \right) \quad (12)$$

Here we see that the relevant multiplier is given by 1 over the share of regional household income coming from tradables ( $v_t$ ), multiplied by the change in total regional household income per unit change in the production of tradables. This brings our estimation procedure very much in line with that of economic base models, with semi-input-output models, and indeed with complete input-output models (Haggblade, et al., 1991). A final simplification will bring us close to an operational form of the multiplier that seems promising in the present research task. Assume that the economies of rural West Africa have Leontief technology and thus it is reasonable to assume that  $a_m = a_n$  and that  $v_n = v_t$ . This then allows us to write  $a_m = a_n = a_n$  and  $v_n = v_t = v$ . Now the multiplier of interest is seen to be:

$$M = \frac{1}{1 - a_n - \beta_n v (1 - s)} \quad (13)$$

This formulation allows us to derive plausible multipliers based on just four parameters:

$a_n$  = the Leontief coefficient for intermediate demand;

$\beta_n$  = the marginal (incremental) share of total expenditures to non-tradables;

$v$  = the share of gross output in the regional economy that goes to household income;

$s$  = leakage from the regional economy in the form of taxes and savings.

Each of these parameters can be estimated with the appropriate investment in primary data collection and the use of existing secondary data.

## APPENDIX II: The Employment Multipliers

Drawing on several earlier studies (Bromley, 1972; Pagoulatos et al., 1986), it has been observed that when an input-output table is available at, say a national level, reliable sub-national level income and employment multipliers can be obtained with few calculations. Sectoral output, income, employment, and household consumption information at the sub-regional-level increases the accuracy of the estimation.

Let  $A^c$  be an  $[(m - v) \times (n - v)]$  matrix, where  $v$  is the number of sectors of the  $(m=n)$  national level endogenous sectors which do not exist at the sub-national level. Let  $B$  be the Leontief inverse matrix  $(I - A^c)^{-1}$  with elements  $b_{ij}$ . These elements represent the direct and indirect effects on output of the  $i^{th}$  sector from a change in the final demand of sector  $j$ .

Furthermore:

Let  $H$  be the  $1 \times (n - v)$  row vector whose elements  $h_{oj}$  are the ratios of the sub-national household services purchased by the  $j^{th}$  sector to the total  $j^{th}$  sector input;

Let  $F$  be the  $(n - v) \times 1$  column vector whose elements  $f_{io}$  are the sub-national consumption coefficients of the household;

Let  $g$  be the county intra-household consumption coefficient;

Let  $h_{oj}$  be the ratio of the sub-regional-level household services purchased by the  $j^{th}$  sector to the total  $j^{th}$  sector input; and

Let  $p_{oj}$  be the county-level direct employment coefficients per currency unit (cedi) of output of the  $j^{th}$  sector.

Then according to Pagoulatos et al. (1986), the direct and indirect income multipliers (Type I multipliers)  ${}_1m_j$  are obtained as the ratio of the direct plus indirect income effects to the direct income effect:

$${}_1m_j = \frac{\sum h_{oi} b_i}{h_{oj}}$$

The Type II income multipliers (direct, indirect and induced effects) can be obtained as a multiple of a constant term  $\Theta$  of the Type I income multiplier:

$${}_2m_j = {}_1m_j \Theta$$

where  $\Theta$  is a scalar and is given by:  $\Theta = [1 - (g + HBF)]^{-1}$

The Type I employment multiplier  ${}_1e_j$  can be obtained as

$${}_1e_i = \frac{\sum p_{oi} b_i}{p_{oj}}$$

And the Type II employment multiplier  ${}_2e_i$  is given by a multiple  $\varphi$  of the Type I employment multiplier where:  $\varphi = PBF[1 - (g + HBF)]^{-1}$ .

## APPENDIX III: Sample of Data Collection Questionnaires used

### Questionnaire #6 Cashew Farmer

Date: \_\_\_\_\_; # of Interview Today (1, 2,..)\_\_\_\_; Interviewer \_\_\_\_\_: Time started: \_\_\_\_\_:  
Country \_\_\_\_\_; District \_\_\_\_\_; Village \_\_\_\_\_;  
Respondent Name (if not willing, skip): \_\_\_\_\_; Age: \_\_\_\_\_; Marital status \_\_\_\_\_;  
Number of adults ( $\geq 18$  years) regularly living in house/compound: \_\_\_\_\_; How many are women \_\_\_\_\_;

#### I. The Farm

1. Which crops were grown by the family/compound in 2009?

Crop \_\_\_\_\_ area (ha) \_\_\_\_\_ average yield per ha. \_\_\_\_\_ average selling price \_\_\_\_\_ (units)  
Crop \_\_\_\_\_ area (ha) \_\_\_\_\_ average yield per ha. \_\_\_\_\_ average selling price \_\_\_\_\_ (units)  
Crop \_\_\_\_\_ area (ha) \_\_\_\_\_ average yield per ha. \_\_\_\_\_ average selling price \_\_\_\_\_ (units)  
Crop \_\_\_\_\_ area (ha) \_\_\_\_\_ average yield per ha. \_\_\_\_\_ average selling price \_\_\_\_\_ (units)  
Crop \_\_\_\_\_ area (ha) \_\_\_\_\_ average yield per ha. \_\_\_\_\_ average selling price \_\_\_\_\_ (units)

2. Other household income in 2009:

Source/item \_\_\_\_\_ Amount \_\_\_\_\_  
Source/item \_\_\_\_\_ Amount \_\_\_\_\_  
Source/item \_\_\_\_\_ Amount \_\_\_\_\_

#### Cashews

3. How many people in this family/compound are active in cashew farming? \_\_\_\_\_

4. During cashew harvesting season how many hours per day would each of the above work directly with cashews?

Person #1 \_\_\_\_\_ Person #2 \_\_\_\_\_ Person #3 \_\_\_\_\_ Person #4 \_\_\_\_\_

5. How many hours of total work in 2009 were devoted to these cashew activities?

Tree maintenance (pruning, weeding) \_\_\_\_\_; Picking \_\_\_\_\_; Drying nuts \_\_\_\_\_;  
Processing \_\_\_\_\_; Marketing \_\_\_\_\_; other (specify) \_\_\_\_\_;

6. Who is in charge of the cashew enterprise? \_\_\_\_\_

7. What share of total production of nuts came from:

Farm fields \_\_\_\_\_; What is the average age of the cashew trees on these fields? \_\_\_\_\_

Fallow land \_\_\_\_\_; What is the average age of the cashew trees on these fields? \_\_\_\_\_

8. For each type of land from which cashew nuts are collected, who controls that land (and the trees)?

Farm fields \_\_\_\_\_

Fallow land \_\_\_\_\_

9. What was the total income from the sale of cashew nuts in 2009? \_\_\_\_\_

10. What was the total income came from the sale of cashew apples in 2009? \_\_\_\_\_

11. List the *expenses* for 2009 associated with total *cashew* production and sales (include credit as an expense):

- Item \_\_\_\_\_ cost \_\_\_\_\_

**II. Marketing and Sales**

12. What quantity of your production of cashew nuts in 2009 was sold to:

- Local cooperative/association \_\_\_\_\_ Average price received? \_\_\_\_\_
- Local assembler \_\_\_\_\_ Average price received? \_\_\_\_\_
- Cashew exporter \_\_\_\_\_ Average price received? \_\_\_\_\_
- Processing association/plant \_\_\_\_\_ Average price received? \_\_\_\_\_

13. What other means did you use to sell cashew nuts? (list various means on each line)

- Sales through \_\_\_\_\_ total sales \_\_\_\_\_ Average price? GH¢ \_\_\_\_\_ (currency and units)
- Sales through \_\_\_\_\_ total sales \_\_\_\_\_ Average price? GH¢ \_\_\_\_\_ (currency and units)

14. Specify the MODE of sale of nuts to the following?

	Cash	Credit	Cash/credit	Distance from farm	Total transport costs paid by you
Own Association					
Local Association					
Local Assembler					
Exporter					
Processor					

15. Are you satisfied with the cashew marketing alternatives available to you? Explain:

16. What transport options exist for getting your cashews to the desired market?

- Haulage vehicle \_\_\_\_\_
- Passenger vehicle \_\_\_\_\_
- Others \_\_\_\_\_

17. How many checkpoints/barriers are on the typical route for marketing your cashews? \_\_\_\_\_
18. What is the average fee levied on you at *each* checkpoint for transporting cashews to market? \_\_\_\_\_
19. What is the typical delay (in minutes) at each of these checkpoints? \_\_\_\_\_

### **III. Cashew Organization Membership**

20. Are you a member of a cashew association or cooperative?\_\_; If yes, which one?
21. How much in annual dues do you pay? GH¢ \_\_\_\_\_
22. How are the leaders of the association selected? \_\_\_\_\_
23. Has membership helped you to:
- Improve your production of cashews? \_\_\_\_\_
  - Improve the quality of your cashew nuts? \_\_\_\_\_
  - Improve the price you receive for cashew nuts? \_\_\_\_\_
  - Reduce cost of your production of cashew? \_\_\_\_\_
  - Eliminate transport costs? \_\_\_\_\_
  - Improve the quality of your processed nuts? \_\_\_\_\_
  - Improve the price you receive for your processed nuts? \_\_\_\_\_
  - Improved transparency in determining weight of bagged cashew? \_\_\_\_\_
  - Improve access to loans? \_\_\_\_\_

### **IV. Uses of Cashew Income**

24. What share of total expenditures in 2009 for the following items came from *cashew* income?
- |  |   |
|--|---|
| Food expenses: _____                       | share of total costs coming from cashew income _____%   |
| Education expenses: _____                  | share of total costs coming from cashew income _____%   |
| Clothing expenses: _____                   | share of total costs coming from cashew income _____%   |
| Weddings, funerals, births expenses: _____ | share of total costs coming from cashew income _____%   |
| Church offertory expenses: _____           | share of total costs coming from cashew income _____%   |
| Medical expenses: _____                    | share of total costs coming from cashew income _____%   |
| Savings _____                              | share of total savings coming from cashew income _____% |

## **V. Taxes and Levies**

25. How much levy do you pay per day/ week/month/year to local authorities? \_\_\_\_\_

26. How much market toll do you pay per day/ week/month/year? \_\_\_\_\_

## **VI. Credit**

27. List the sources of credit you used for your total farming operation in 2009:

Source \_\_\_\_\_ amount \_\_\_\_\_ purpose \_\_\_\_\_ period (months) \_\_\_\_\_ interest rate per month \_\_\_\_\_%

Source \_\_\_\_\_ amount \_\_\_\_\_ purpose \_\_\_\_\_ period (months) \_\_\_\_\_ interest rate per month \_\_\_\_\_%

Source \_\_\_\_\_ amount \_\_\_\_\_ purpose \_\_\_\_\_ period (months) \_\_\_\_\_ interest rate per month \_\_\_\_\_%

28. Did you pay any “facilitation fees” on the above loans to expedite processing?

List those here for each source:

Source \_\_\_\_\_ facilitation fees \_\_\_\_\_

Source \_\_\_\_\_ facilitation fees \_\_\_\_\_

29. Are you satisfied with the availability and cost of credit for your farm operation? \_\_\_\_\_ Explain:

## **VII. Outlook**

30. How would you change your farm practices (especially cashew production) if you were sure that *average annual cashew prices* would *increase* by 10% each of the next two seasons and remain high?

Expand land area devoted to cashews \_\_\_\_\_? Spend more time on tree improvement \_\_\_\_\_?

Increase spending on agrochemicals \_\_\_\_\_? Replace old trees \_\_\_\_\_?

Other \_\_\_\_\_

31. How would you change your farm practices (especially cashew production) if you were sure that *average annual cashew prices* would *fall* by 10% each of the next two seasons and remain low?

Replace cashew trees with other crops \_\_\_\_\_? Abandon cashew farm? \_\_\_\_\_

Spend less time on tree improvement \_\_\_\_\_? Other \_\_\_\_\_

End time: \_\_\_\_\_

## Questionnaire #7 Cashew Association

Date: \_\_\_\_\_; # of interview today (1, 2..) \_\_\_\_\_; Interviewer \_\_\_\_\_; Time started: \_\_\_\_\_;

Country \_\_\_\_\_; District \_\_\_\_\_; Village \_\_\_\_\_;

Name of association \_\_\_\_\_

Respondent's name \_\_\_\_\_; Position in the association/cooperative \_\_\_\_\_

### I. Organization

1. How many members are there in the organization? \_\_\_\_\_

2. What is the annual cost of membership? \_\_\_\_\_

3. Are work obligations a condition of membership? \_\_\_\_\_ If yes, describe those obligations:

Attend meetings regularly \_\_\_\_\_

Participate in joint marketing activities \_\_\_\_\_

Contribute toward welfare of members \_\_\_\_\_

Bulk purchase of agrochemicals \_\_\_\_\_

Pay dues regularly \_\_\_\_\_

Others \_\_\_\_\_

4. How are the leaders of the association selected? Describe:

5. Which officers of the association receive pay for their work?

Purchasing clerks \_\_\_\_\_ Executives \_\_\_\_\_

6. Rank the primary services and activities of the association?

Group *marketing* of raw cashew nuts? \_\_\_\_\_

*Processing* of cashew nuts? \_\_\_\_\_

Improve the total *production of nuts* from the village? \_\_\_\_\_

Improve the *quality* of cashew nuts from the village? \_\_\_\_\_

Improve the *price* received for cashew nuts? \_\_\_\_\_

Improve the *quality* of *processed* nuts? \_\_\_\_\_

Improve the *price* received for **processed** nuts? \_\_\_\_\_

Provide *social services* \_\_\_\_\_

Other: \_\_\_\_\_

7. Does your association have a savings plan for members? \_\_\_\_\_ If yes, describe and indicate what interest rates are paid on such savings. \_\_\_\_\_ %
8. Does the association give loans to members? \_\_\_\_\_ If yes, describe and indicate interest rates charged for various types of loans. \_\_\_\_\_ %
9. What was the total value of loans given during 2009? GH¢ \_\_\_\_\_
10. How much money was lost during 2009 because of defaults? GH¢ \_\_\_\_\_
11. Does the association receive assistance from NGOs, government, development partners etc? If yes, describe that help:

Type of Support	NGOs	Government	Development Partners
Technical training			
Business training			
Managing bush fire			

## **II. Financial Issues**

12. List the association's assets and their estimated value as at 2009:

Buildings \_\_\_\_\_ total value \_\_\_\_\_

Vehicles (number/type) \_\_\_\_\_ total value \_\_\_\_\_

Machinery (type) \_\_\_\_\_ total value \_\_\_\_\_

Furniture \_\_\_\_\_ total value \_\_\_\_\_

Other \_\_\_\_\_ total value \_\_\_\_\_

13. Did the association *acquire* assets during 2009? (yes / no) If yes, list the asset, its purchase price, and whether it was purchased in West Africa or imported from abroad.

Asset \_\_\_\_\_ Price \_\_\_\_\_ Purchased in West Africa or imported? \_\_\_\_\_

Asset \_\_\_\_\_ Price \_\_\_\_\_ Purchased in West Africa or imported? \_\_\_\_\_

Asset \_\_\_\_\_ Price \_\_\_\_\_ Purchased in West Africa or imported? \_\_\_\_\_

14. Did the association *repair* assets during 2009? (yes/no) If yes, list the assets, the cost of repair, and indicate what fraction of those costs was paid within West Africa.

Asset \_\_\_\_\_ Repair cost \_\_\_\_\_ Paid in West Africa or imported?

Asset \_\_\_\_\_ Repair cost \_\_\_\_\_ Paid in West Africa or imported?

Asset \_\_\_\_\_ Repair cost \_\_\_\_\_ Paid in West Africa or imported?

**III. Business Activities**

15. What quantity (80kg bags) of cashew nuts was purchased from association *members* in 2009? \_\_\_\_\_
16. What was the average price paid for cashew nuts purchased from *members* in 2009? GH¢\_\_\_\_\_/kg or bag
17. What quantity (80kg bag) of cashew nuts purchased from *non-members* of the association in 2009? \_\_\_\_\_
18. What was the average price paid for cashew nuts purchased from *non-members* in 2009?GH¢\_\_\_/kg or bag
19. Describe the marketing and sales of *nuts* by the association in 2009:

Buyers	Quantity of <i>Raw</i> nuts sold to buyer Kg/80kg bags/MT	Average <i>price</i> received per kg/80kg bag/MT	Quantity of <i>processed nuts</i> (Kernels) sold to buyer	Average <i>price</i> received
Savannah Marketing Company				
BETS Export company				

20. What amounts of total nut *purchases* and *sales* occurred, by month, in 2009:

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total quantity purchased (80kg bags/MT)												
Total quantity sold (80kg bags/MT)												
Total cost of purchases (GH¢)												
Total value of sales (GH¢)												

22. What was the total income of the association from all *cashew-related* business activities in 2009?
23. What was the total income of the association from members' dues and other fees in 2009?
24. What other sources of *non-cashew* income did the association have in 2009?

Source \_\_\_\_\_ total income \_\_\_\_\_

Source \_\_\_\_\_ total income \_\_\_\_\_

25. List all association expenses for 2009:

ITEM	COST (GH¢)	IN COUNTRY SPENDING	SPENDING ON IMPORT
Labour			
Rent			
Phone bills			
Electricity			
Social expenses (funeral)			
Association Registration			
Transportation			
Demand notices			

Time Ended: \_\_\_\_\_

## Questionnaire #8 Cashew Transporter

Date: \_\_\_\_\_; # of interview today (1, 2..) \_\_\_\_\_; Interviewer \_\_\_\_\_;

Time started: \_\_\_\_\_; Country \_\_\_\_\_; District \_\_\_\_\_;

Village \_\_\_\_\_; Name of transport firm \_\_\_\_\_ Respondent's name \_\_\_\_\_; Position in transport firm \_\_\_\_\_

1. How many 80kg bags of cashews (nuts and kernels) did you transport in 2009?

2. Describe the trips in which you hauled cashews:

A. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_\_\_

#of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)

For this trip, complete the table:

Nature of stop	Average # of stops on this trip by:	Average delay per stop	Average fee paid per stop	Average travel time (including stops)
Police				
Customs				
Transport Union				
Forest Guards				
Other				

B. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_\_\_

#of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)

For this trip, complete the table:

Nature of stop	Average # of stops on this trip by:	Average delay per stop	Average fee paid per stop	Average travel time (including stops)
Police				
Customs				
Transport Union				
Forest Guards				
Other				

C. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_\_\_  
 #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)

For this trip, complete the table:

Nature of stop	Average # of stops on this trip by:	Average delay per stop	Average fee paid per stop	Average travel time (including stops)
Police				
Customs				
Transport Union				
Forest Guards				
Other				

- What do you charge per 80kg bag to haul cashew nuts or kernels for a given distance? GH¢ \_\_\_\_\_
- What were your total earnings in 2009 from hauling cashew nuts and kernels? GH¢ \_\_\_\_\_
- What was your total income from transport business in 2009? GH¢ \_\_\_\_\_
- What proportion of your total business income in 2009 came from hauling cashew nuts or kernels? \_\_\_\_\_%
- Estimate the costs of operating your transport business in 2009 (GH¢):
  - Truck(s) purchase price \_\_\_\_\_ Truck(s) useful life \_\_\_\_\_ yrs.
  - Truck(s) annual cost of loan for purchase \_\_\_\_\_
  - Insurance \_\_\_\_\_
  - Roadworthy certificate \_\_\_\_\_
  - Fuel \_\_\_\_\_
  - Engine Oil \_\_\_\_\_
  - Equipment maintenance \_\_\_\_\_
  - Hired labour (Driver & Mates) \_\_\_\_\_
  - Tyres \_\_\_\_\_
  - Tarpaulin \_\_\_\_\_
  - Packing tolls \_\_\_\_\_
  - Total taxes \_\_\_\_\_
  - Credit \_\_\_\_\_
  - Expediter \_\_\_\_\_
  - Loading and unloading \_\_\_\_\_
  - Other costs (specify) \_\_\_\_\_
  - Other costs (specify) \_\_\_\_\_
  - Other costs (specify) \_\_\_\_\_

Time ended \_\_\_\_\_

## Questionnaire #14 Wood Products Producer

Date: \_\_\_\_\_; # of Interview Today (1, 2,..)\_\_\_\_; Interviewer \_\_\_\_\_: Time started: \_\_\_\_\_:

Country \_\_\_\_\_; District \_\_\_\_\_; Village \_\_\_\_\_;

Respondent Name (if not willing, skip): \_\_\_\_\_; Age: \_\_\_\_\_; Marital status \_\_\_\_\_;

Number of adults ( $\geq 18$  years) regularly living in house/compound: \_\_\_\_\_; How many are women \_\_\_\_\_;

### THE HOUSEHOLD

1. Rank the following in order of their importance in the activities of the household/enterprise in 2009

- |                               |                                 |
|-------------------------------|---------------------------------|
| a. Trading _____              | d. Making wood products _____   |
| b. Farming _____              | e. Wage employment _____        |
| c. Artisan (e.g. mason) _____ | f. Other (please specify) _____ |

2. Please provide the following information *either* on your total farming activities *or* on the individual crops, on your livestock production and any other income sources in 2009

Activity	Quantity produced	Quantity sold	Selling price	Total income
Millet				
Yam				
Rice				
Corn				
Total farming*				
Livestock				
Other (specify)				
Other (specify)				

\* should be used if the respondent cannot recall data for individual crops

3. What amount of income did you earn from the following activities in 2009?

Activity	Amount earned	Details
Trading (in items or than wood products)		
Artisan's production		
Wage employment		
Remittances		
Others (please list):		

i.		
ii.		
iii.		
iv.		

### **PRODUCTION**

4. How many people in your household are active in making wood products? \_\_\_\_\_

5. On average how many hours per day would each of the above work directly with wood products?

Person #1 \_\_\_\_\_ Person #2 \_\_\_\_\_ Person #3 \_\_\_\_\_ Person #4 \_\_\_\_\_

Person #5 \_\_\_\_\_ Person #6 \_\_\_\_\_ Person #7 \_\_\_\_\_ Person #8 \_\_\_\_\_

6. Please complete the following table in respect of each type of wood *piece* or wood *product* in 2009

Type of Wood Piece or product line	Quantity sold in market	Average price received	Quantity sold to agents	Average price received
Drums				
Masks				
Furniture				
Native Stools				
Bowls				
Other Carvings				
Other (specify)				
Other (specify)				

Note: This will cover large or small scale producers and those who just make pieces of a product. In the case where none is sold on the market or to agents those columns will be left blank.

7. Please help us complete the table of materials needed for your *total* production of various wood products in 2009

Product line and their inputs	Quantity purchased	Where acquired	Price per unit	Total materials cost in 2009
<b>DRUMS</b>				
<b>MASKS</b>				
<b>FURNITURE</b>				
<b>BOWLS</b>				
<b>NATIVE STOOLS</b>				
<b>OTHER CARVINGS</b>				
<b>OTHERS (Specify)</b>				
<b>ELECTRICITY (Kwh)</b>				
<b>TOOLS</b>				

Note:- the last column provides us with the most important information

8. Enter the amount paid to each category of worker per month or hired labour whether in cash or in kind.

Worker	Category	Work done	Payment in kind	Payment in cash	Total payment	Any Comment
Hired Labor	Category	Work done	Payment in kind	Payment in cash	Total payment	Any Comment

## **MARKETING**

9. What are the marketing channels for your products?

Market	Sell direct to individuals (retail)	Sell through agents or exporters	Sell through producers' association	Sell through NGOs	Wholesale sales to other businesses who resell products
Local					
Regional					
National					
International					

10. Did you benefit from any of the following Services or associations (Provide details if your response is 'Yes')

Service	Response (Yes/No)	Details
Subsidy		
Susu Group		
Woodcraft/Handcraft' Association		
Technical/Extension services		
Market information		
Storage/warehouse		
Government services, such as Export Promotion Counsels, etc.		
Other (please specify)		

11. Rank the following in order of the degree to which they hinder the successful operation of your business

Item	Rank	Details
Getting people to buy your product		
Difficulty in getting wood		
Difficulty in getting credit		
Difficulty in getting business advisory services		
Competition from factory made products (eg. Plastic, glass and metal products)		
Getting market demand information		
Lack of Storage facilities		
Obtaining Designs or Developing Designs		
International Wood Product Certifications		
Other (specify)		

**HOUSEHOLD EXPENDITURE**

12. What share of total household expenditures in 2009 for these items came from wood and related products?

Food expenses: \_\_\_\_\_ share of total costs coming from wood income \_\_\_\_\_ %

Education expenses: \_\_\_\_\_ share of total costs coming from wood income \_\_\_\_\_ %

Clothing expenses: \_\_\_\_\_ share of total costs coming from wood income \_\_\_\_\_ %

Weddings, funerals, births expenses: \_\_\_\_\_ share of total costs coming from wood income \_\_\_\_\_%

Church offertory expenses: \_\_\_\_\_ share of total costs coming from wood income \_\_\_\_\_%

Medical expenses: \_\_\_\_\_ share of total costs coming from wood income \_\_\_\_\_ %

Savings \_\_\_\_\_ share of total savings coming from wood income \_\_\_\_\_ %

**TAXES**

13. Please provide the following information on taxes paid in 2009

<b>Taxes paid in 2009</b>	
Amount	Details
	Corporate tax
	Market Tolls
	Forestry Commission charges
	District Assembly taxes
	IRS
	International Certification Fees
	Others (specify)
	Others
	Others

**CREDIT**

14. Please provide the following information on any applications you made for loans and advances in the last 3 years

Year	Source	Advances (amount received)	Loan Amount applied for	Loan Amount granted	Purpose of Loan or Advance	Period (months)	Interest (per month)
2007							
2008							
2009							

15. Did you pay any “facilitation fees” on the above loans to expedite processing?  
List those here for each source:

Source \_\_\_\_\_ facilitation fees \_\_\_\_\_

Source \_\_\_\_\_ facilitation fees \_\_\_\_\_

Source \_\_\_\_\_ facilitation fees \_\_\_\_\_

**OUTLOOK**

16. How would you change your production if you were sure that the *average price* would *increase* by 30%-50% in each of the next two years and remain high?

17. How would you change your production if you were sure that the *average price* would *fall* by 30%-50% in each of the next two years and remain low?

End time: \_\_\_\_\_

## Questionnaire #15 Wood Inputs Supplier

Date: \_\_\_\_\_; # of Interview Today (1, 2,..)\_\_\_\_; Interviewer \_\_\_\_\_: Time started: \_\_\_\_\_:

Country \_\_\_\_\_; District \_\_\_\_\_; Village \_\_\_\_\_;

Respondent Name (if not willing, skip): \_\_\_\_\_; Age: \_\_\_\_\_; Marital status \_\_\_\_\_;

Number of adults (≥ 18 years) regularly living in house/compound: \_\_\_\_\_; How many are women \_\_\_\_\_;

### ACTIVITIES

1. Rank the following in order of their importance in your business for 2009

- |                             |  |
|-----------------------------|--|
| a. Farming _____            | d. Selling inputs used in making wood products _____ |
| b. Trading activities _____ | e. Artisan (e.g. mason) _____                        |
| c. Wage employment _____    | f. Other (please specify) _____                      |

2. Please provide the following information on the goods you bought and sold in 2009

Type of goods	Where purchased	Where sold	Units bought in 2009	Price paid per unit	Selling price per unit
Rough Wood Cuts					
Polish					
Thread					
Leather					
<b>Others (specify):</b>					
a.					
b.					
c.					
d.					
e.					

3. If you have employees please state the amount paid to each of them per month, whether in cash or in kind, for work done (*for commercial entities only*)

Worker	Work done	Payment in kind	Payment in cash	Total payment	Comment

**CREDIT**

4. Please provide the following information on any application you made for loans and advances in the last 3 years

Year	Source	Advances received (from producers)	Amount applied for	Amount granted	Purpose	Period (months)	Interest (per month)
2007							
2008							
2009							

5. Did you pay any “facilitation fees” on the above loans to expedite processing? List those here for each source:

Source \_\_\_\_\_ facilitation fees \_\_\_\_\_  
 Source \_\_\_\_\_ facilitation fees \_\_\_\_\_  
 Source \_\_\_\_\_ facilitation fees \_\_\_\_\_  
 Source \_\_\_\_\_ facilitation fees \_\_\_\_\_

**TAXES AND LEVIES**

6. How much levy do you pay per day/ week/month/year to local authorities? \_\_\_\_\_

7. How much market toll do you pay per day/ week/month/year? \_\_\_\_\_

8. Provide the following information on the trips on which you hauled materials for the wood products:

- A. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- B. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- C. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- D. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- E. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- F. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)

9. Provide the following summary information on the trips in which you hauled the above items.

Type of checkpoint	Average # of checkpoints per trip	Average delay at checkpoint	Average fee paid at checkpoint)	Average travel time (including stops)
Police				
Customs				
Transport union				
Forests guards				
Other (please list)				

10. What was your total income from the following activities in 2009?

Activity	Amount earned	Details
Trading in <i>wood</i> products		
Trading in other goods		
Artisan's production		
Wage employment		
Others (please list)		

Time ended \_\_\_\_\_

## Questionnaire #16 Wood Products Transporter

Date: \_\_\_\_\_; # of interview today (1, 2..) \_\_\_\_\_; Interviewer \_\_\_\_\_; Time started: \_\_\_\_\_;

Country \_\_\_\_\_; District \_\_\_\_\_; Village \_\_\_\_\_;

Name of transport firm \_\_\_\_\_

Respondent's name \_\_\_\_\_; Position in transport firm \_\_\_\_\_

1. What proportion of your total income in 2009 came from hauling materials for making wood carving and furniture \_\_\_\_\_

2. Provide the following information on the trips on which you hauled materials for the wood sector:

- A. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- B. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- C. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- D. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- E. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)
- F. Origin \_\_\_\_\_ Destination. \_\_\_\_\_ km. \_\_\_\_\_ #of trips in 2009 \_\_\_\_\_ Circle condition of road (good, fair, poor)

3. Provide the following summary information on the trips in which you hauled the above items.

Type of checkpoint	Average # of checkpoints per trip	Average delay at checkpoint	Average fee paid at checkpoint	Average travel time (including stops)
Police				
Customs				
Transport union				
Forest guards				
Other				

4. Select the method you use for charging for wood products you transport and the corresponding amount that you charge

Method of charging	Amount charged
Per truckload	
Per tonne	
Per 20 ft Container load	
Per 40 ft Container load	
Any other method of charging	

5. What were your total earnings in 2009 from hauling wood and finished wood products? \_\_\_\_\_

**CREDIT**

6. Please provide the following information on applications you made for loans in the last 3 years

Year	Source	Amount applied for	Amount granted	Purpose	Period (months)	Interest (per month)
2007						
2008						
2009						

7. Did you pay any “facilitation fees” on the above loans to expedite processing? List those here for each source:

Source \_\_\_\_\_ facilitation fees \_\_\_\_\_  
 Source \_\_\_\_\_ facilitation fees \_\_\_\_\_  
 Source \_\_\_\_\_ facilitation fees \_\_\_\_\_  
 Source \_\_\_\_\_ facilitation fees \_\_\_\_\_

8. Estimate the annual cost of operating your transport business for 2009

Type of cost	Amount	As a % of wood products' income
Payment for purchase of vehicle		
Insurance		
Fuel and oil		
Maintenance		
Hired labour		
Tyres		
Tarpaulin		
Station tolls		
District Assembly toll		
Transport union charges		
IRS		
Loading		
Unloading		
Other taxes		
Other costs		

\*calculate using question 5

9. What problems do you face in your transport business? -----

Time ended \_\_\_\_\_

## Transporter Questionnaire

### Estimating the Effects of Exports on Household Incomes in the Brong Ahafo Region

REGION:.....

Town:.....

DISTRICT:.....

HOUSEHOLD No.:.....

#### GENERAL INFORMATION

1. Name of transporter:.....
2. Is the transporter the household head?    1. Yes            2. No
3. Age of respondent:.....
4. Gender of respondent: 1. Male    2. Female
5. Education of respondent (in number of years).....
6. Household size .....

#### SOURCES OF HOUSEHOLD INCOME

Sources of household incomes	Amount Per Annum (GH¢)		
	2007	2008	2009
1. Processing.....			
2. Farming.....			
3. Civil servant.....			
4. Artisans.....			
5. Trading/Exporting.....			
6. Driving.....			
7. Remittances.....			
8. Return on investments.....			
9. Others .....			
Others.....			

**SAVINGS OF RESPONDENT/HOUSEHOLD**

- 10. How do you save for future needs?  
.....  
.....
- 11. Do you have a savings account with any bank? 1. Yes 2. No
- 12. How much in GH¢ do you save in a day/week/month/year?.....

**TAXES AND LEVIES**

- 13. How much tax do you pay per week/month/year on income? GH¢.....
- 14. How much VAT do you pay per week/month/year? GH¢.....
- 15. How much NIHS do you pay per week/month/year? GH¢.....
- 16. How much levy do you pay per day/ week/month/year to local authorities? GH¢.....
- 17. How much parking toll do you pay per day/ week/month/year? GH¢.....

**PRICES**

- 18. Transport cost per MT/KG per kilometer in GH¢? .....

**QUANTITY TRANSPORTED**

- 19. Quantity of cashew kernel transported in kg? .....
- 20. Quantity of cashew nuts transported in kg? .....

**ROAD NETWORK/BARRIERS**

- 21. How would you describe the road between point of production and point of sale? 1. Good 2. Satisfactory 3. Bad
- 22. Number of barriers between point of cashew production and point of sale?.....
- 23. What is the distance in km between point of production and point of sale? .....

**HOUSEHOLD EXPENDITURE (GH¢)**

**Per month/year**

- 24. Expenditure on Food.....
- 25. Consumption of own food.....
- 26. Expenditure on Beverages.....
- 27. Expenditure on Tobacco.....
- 28. Expenditure on non food.....
- 29. Expenditure on Housing.....
- 30. Expenditure on own non food.....

**APPENDIX IV: Income Generation in Basket and Wood Product Sectors in Ghana**

**JUNE 2010**

This report was produced by T.O. Antwi-Asare, W.A. Rahaman of The Department of Economics, University of Ghana, Legon and Professor Daniel W. Bromley of the University of Wisconsin, Madison, and prepared for the USAID West Africa Trade Hub Funded as part of the study on Exports, Employment and Incomes in West Africa.

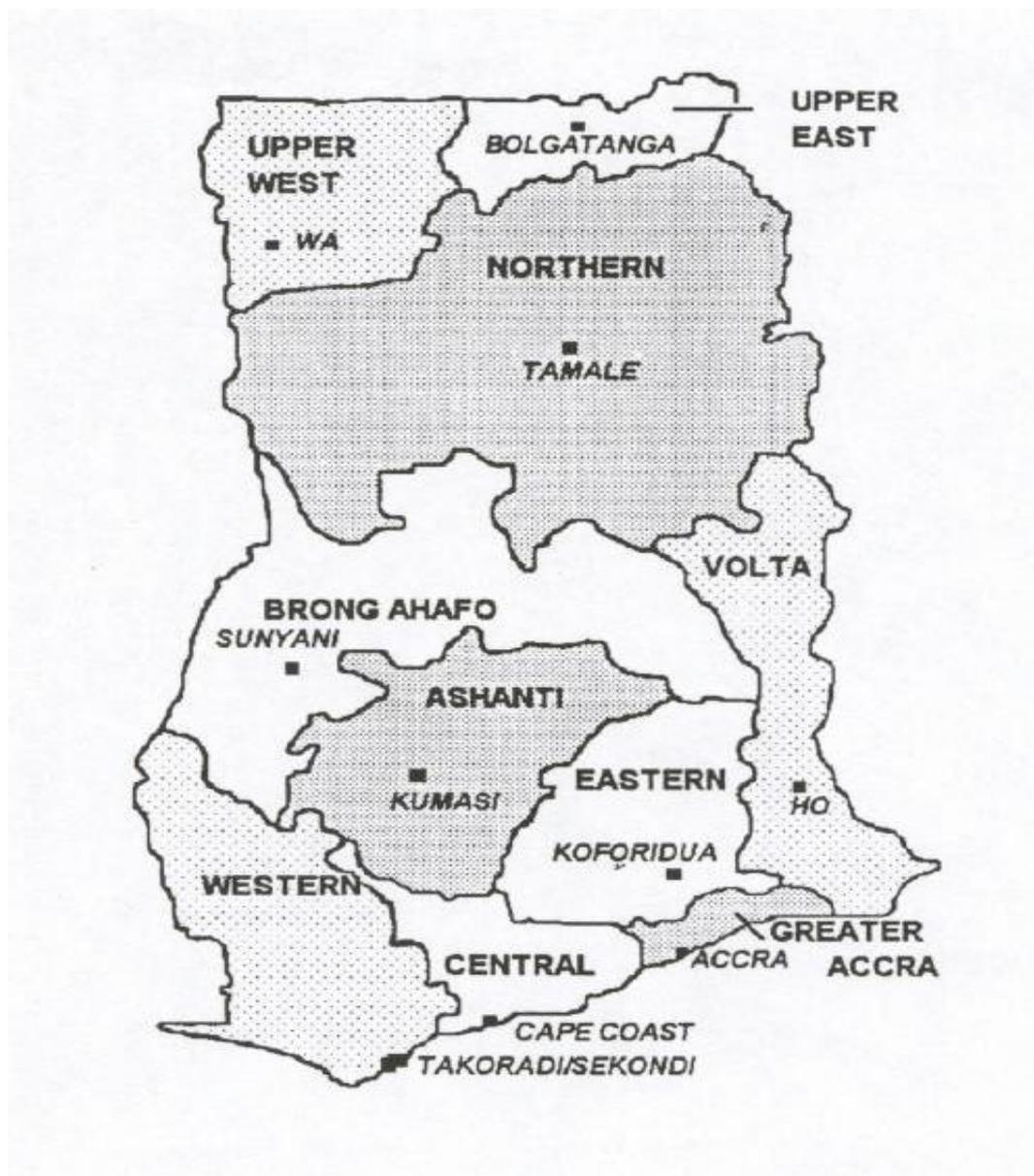
## **Acknowledgments**

The baskets and wood handcraft sectors play an important role in the overall employment and income generation of communities in the Upper East and Ashanti Regions of Ghana. These sectors have the potential to emerge as major income and employment generators in those localities. This will be realized when policymakers focus on reducing the challenges faced at every stage of the export value chain.

Thanks are due to the many people who agreed to be interviewed for this project. The research team also expresses its appreciation to Professor Daniel Bromley the team leader for the overall West African study for his guidance and contributions to the report. We thank Dr S.K. Akoena of the Dept. Of Economics University of Ghana for his work to shape the proposal submitted to the West African Trade Hub and preparation of the questionnaires. Finally we are grateful for the support and active interest in the study shown by Jane Owiredu-Yeboah, Kafui Djonou and other staff of the Trade Hub.

Financial support for this report was made possible by the support of the American people through the U.S. Agency for International Development (USAID), Carana Corporation and the West Africa Trade Hub. Nevertheless, the views expressed in this document do not necessarily reflect the views of USAID, Carana or West Africa Trade Hub.

## MAP OF GHANA



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## Acronyms and Abbreviations

AGOA	African Growth and Opportunity Act
GLSS	Ghana Living Standards Survey
NGO	Non-Governmental Organization
SAM	Social Accounting Matrix

## Executive Summary

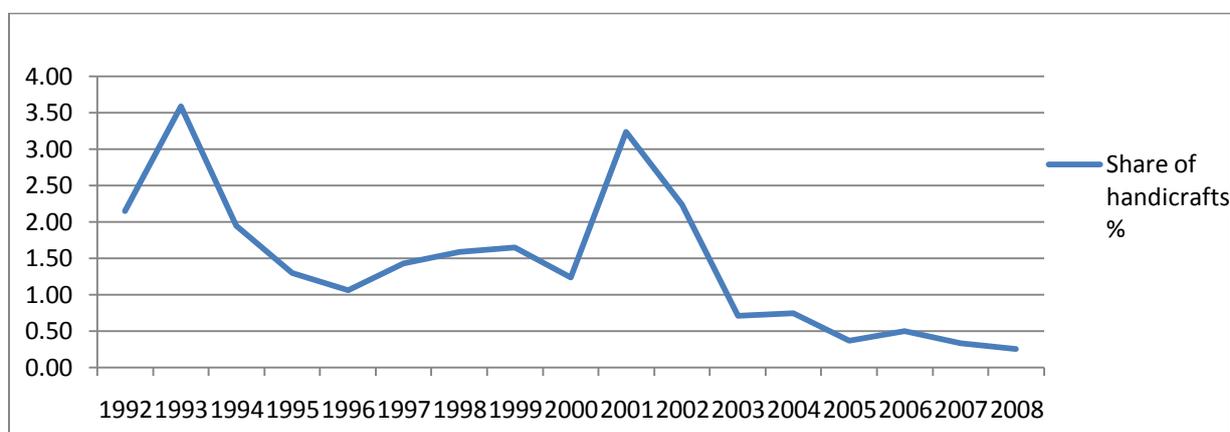
This study formed part of a larger study in parts of West Africa to estimate the income and employment effects arising from the promotion of nontraditional exports. The main focus of the study was to estimate these effects for the Ashanti and Upper East regions of Ghana using two tradable goods produced in these regions. These goods are baskets and related straw-based products produced in the Bolgatanga area of the Upper East region, Wood handcrafts and furniture from the Kumasi metropolis of the Ashanti region.<sup>8</sup> As part of the work, the research team conducted surveys in Bolgatanga on the basket sector and in Kumasi on the wood sector. Other national data sources consulted included the Ghana Social Accounting Matrix (SAM) 2005, the Industrial Census of 2003 and the Ghana Living Standards Survey Round 5.

## Export of Handcrafts

One policy option to increase Ghanaian exports has been the encouragement of nontraditional exports.<sup>9</sup> It has also been proposed as a key to the diversification of Ghana's exports base and may be the factor which could force critical changes in the export supply chain along the lines suggested by Bromley (2009). Two of these export commodities namely, wood carvings and straw-made handcraft products hold much promise for trade creation and diversification.

The handcraft industry used to be one of the fastest growing export sectors of Ghana's economy. However in recent times it has witnessed some dwindling fortunes both in volume and value. Over about two decades the share of handcrafts in Ghana's nontraditional exports has been declining (as shown in Figure 1.1).

**Figure 1.1: Share of Handcrafts in Nontraditional Exports**



Source: Ghana Export Promotion Council

The United States is Ghana's biggest market for handcrafts followed by the European Union particularly Germany, Italy and the U.K. However, recently, most buyers have turned their attention to other countries because some Ghanaian exporters do not deliver on time and most products are repetitions of old designs. For instance, Bolga baskets are losing their markets to Asian competitors particularly from Vietnam who mass-produce at lower cost.

<sup>8</sup> The Ashanti Region was third in terms of industrial output in Ghana while the Upper East Region was 10th or last.

<sup>9</sup> UN (2003), Investment Policy Review for Ghana.

## Basket and Related Straw Product Sector—Upper East Region

Given the endemic poverty in the Upper East Region and the threat from Asian producers—especially from Vietnam—of similar products, policy action to reduce the cost of production, promote exports and increase incomes is vital. The basket-handcraft industry is a highly labor intensive cottage-based industry which is predominately dominated by women in the actual production phase, while the transportation and marketing side are dominated by men. The handcraft industry which includes the production of straw baskets and hats, leather tanning, leather bags and hats, smock weaving has put Bolgatanga's name on the world tourist map. The sector has high potential for self-employment and improving livelihoods in the area. It is characterized by low capital investment, a high share of value addition, export demand with high potential for foreign exchange earnings.

Basket production is conducted mainly during the dry season when there is reduced farming activity. Production is mainly centred on small groups or associations. The average sales of basket producers amounted to GH¢ 723.30 while the average cost of inputs (purchases) used for basket making amounted to GH¢ 218.61 a year.<sup>10</sup> The margins earned make it a viable industry but rising costs of major inputs such as straw and imported dyes are a threat. Straw was brought to Bolgatanga from the Ashanti and Brong Ahafo Regions and its price doubled in the first half of 2010. The lack of suitable and readily available cargo trucks to cart baskets to the Accra market and for export is another serious issue. In the export market these considerations are important because of competition from Asian producers of similar products.

The basket sector has a Type II employment multiplier of 0.16. This indicates that for every GH¢ 100 of basket sales 16 jobs are made possible. This low employment multiplier reflects the fact the production process is simple and requires only a few different skills to complete hence employing only a few people directly. Indeed most basket sector producers are self-employed or in associations and take on few hands. Most income accrues to the operators themselves as payments for labor input is small.

The regional multipliers were estimated based on the survey results and other national data sources.<sup>11</sup> They show the effects on regional income of an increase in the production of tradeables in the regional economy. For the Upper East Region the regional income multiplier was found to be 1.58. This indicates that basket sales of GH¢ 100 generates an additional GH¢ 58 of household income within that region.

## Recommendations for Basket Sector

The key suggestion is to reduce production costs in order to remain competitive on the world market. Recommendations emerging from the study are the following:

- Promote suitable year-round straw production around Bolgatanga by deploying water from the Veia irrigation canal which comes down to the nearby Nyariga area. Government—through the Bolgatanga Municipal Authority—could create a land bank for this purpose.

---

<sup>10</sup> March-April 2010.

<sup>11</sup> Others are the 2005 Ghana SAM, GLSS Round 5 and Industrial Census.

- Establish an inland port at Tamale—this would shorten the distance for delivering goods to shippers. The port could also serve the needs of other sectors in northern Ghana.
- Convert Tamale airport into an international airport—this could also allow air freight of handcrafts and other goods to meet urgent purchase orders apart from boosting the export industry within a day’s journey of Tamale.<sup>12</sup>
- Contract a haulage company—this could be done by the Municipal authorities—to cart the baskets to the ports at specified periods in view of the potentially increased taxes possible from the sector.
- Promote new basket designs and patenting of traditional Bolga designs—this could be facilitated by the Ghana Export Promotion Centre or Ministry of Trade and Industries.
- Facilitate industrial type production by training more people in color combinations and dyeing. Expertise in industrial arts is available from locally from Bolgatanga Polytechnic or Kwame Nkrumah University of Science and Technology.
- Eliminate illegal fees paid at police and customs checkpoints which delay transporters and increase costs
- Provide a better market site with warehouses for basket sellers
- Enhance availability of credit to those in the basket value chain

### **Wood Handcraft and Furniture Sector—Ashanti Region**

This is a sector that employed more than 39,000 Ghanaians nationwide and more than 7,000 people in the Ashanti Region in 2003.<sup>13</sup> Both genders are well represented in this sector.

A number of challenges were found to work against the wood handcraft sector, which include:

- Unfair competition from foreign products
- Limited availability of raw materials (especially wood) and the high cost of wood
- Insufficient demand for products
- Non-availability of credit to expand business
- Long hours spent on making products (i.e. due to the lack of appropriate equipment)
- Low prices offered by buyers
- Non-availability of a proper market to sell wood handcraft products
- Bad roads linking them to where to get raw materials

The wood handcraft industry has positive impacts on the Kumasi area in terms of income and employment generation. The employment multiplier was about 0.1. This means that for GH¢ 100 of sales generated in terms of employment by the wood handcraft sector, 10 new jobs are created. Ashanti Region’s income multiplier was estimated to be 2.15. Hence for GH¢ 100 sales from wood handcrafts an additional GH¢ 115 of income is created in Ashanti Region.

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<sup>12</sup> A 50 mile radius of Tamale could have a viable export-based horticultural industry.

<sup>13</sup> Industrial Census 2003.

## **Recommendations for Wood Handcraft Sector**

Based on the findings of the survey, the following are recommended to policymakers:

- Make full efforts to enhance credit availability to players in the wood sector. This will help the actors to expand their business so as to produce more and employ more people.
- Offer support services in the form of training, market information, and advice to actors. Make efforts to educate players on where to sell their products—in other words, give actors information on market availability.
- Make efforts to reduce the unnecessary harassment wood product transporters encounter when transporting wood to their various destinations.
- Encourage actors to form associations and unions (especially wood-product producers). This will help them to negotiate reasonable prices for their products and also to prevent exploitation by buyers.

## 1. Introduction and Methodology

### 1.1 Introduction

In the recent past, Ghana has achieved reasonable economic growth that has yielded economic growth rates for each year between 1990 and 2009. Gross domestic product is estimated to have grown on average by 4.7% per annum during the 1991-1999 period, 5.0% between 1999 and 2006 and 6.1% per annum between 2006 and 2009. In per capita terms growth has been about 2.0% per annum over 1991-2009.

There have been many schemes to improve Ghana's access to the EU and U.S. markets. The Everything But Arms and African Growth and Opportunity Act (AGOA) initiatives of the EU and U.S. respectively increase access for Sub-Saharan African exports to these areas.<sup>14</sup> In particular AGOA significantly opened up the U.S. market for Ghana and many other Sub-Saharan African countries until 2015. Ghana's main export categories to the United States consist of 'forest products', 'agricultural products', 'energy-related products' and 'minerals and metals'.<sup>15</sup>

**Table 1.1: Trade between the USA and Ghana (in '000\$)**

	2007	2008	2009	Jan-Mar	
				2009 YTD	2010 YTD
Imports from USA	403 928	594 337	619 016	107 487	187 263
Exports to USA	198 652	222 362	134 771	27 540	88 563
Total AGOA including of AGOA'S Generalized System of Preferences provisions	68 580	42 213	19 095	2 453	3 967
U.S. imports from Ghana under the Generalized System of Preferences provisions	12 429	10 719	16 792	2 414	3 681
U.S. imports of duty-free items added under AGOA	56 151	31 494	2 303	39.0	285.0
Trade Balance	205276	371975	484245	79947	98700

Source: Ministry of Trade and Industry, Ghana 2010

One policy option to increase Ghanaian exports has been the encouragement of nontraditional exports.<sup>16</sup> Nontraditional exports have also been proposed as a key to the diversification of Ghana's exports base and may be the factor which could force critical changes in the export supply chain along the lines suggested by Bromley (2009). Two of these export commodities namely, wood carvings and straw-made handcraft products hold much promise for trade creation and diversification. Concomitantly these also are likely candidates to improve livelihoods in the Upper East and Ashanti Regions of Ghana which are important issues for later discussion.

The handcraft industry used to be one of the fastest growing export sectors of Ghana's economy. However in recent times it has experienced dwindling fortunes both in volume and

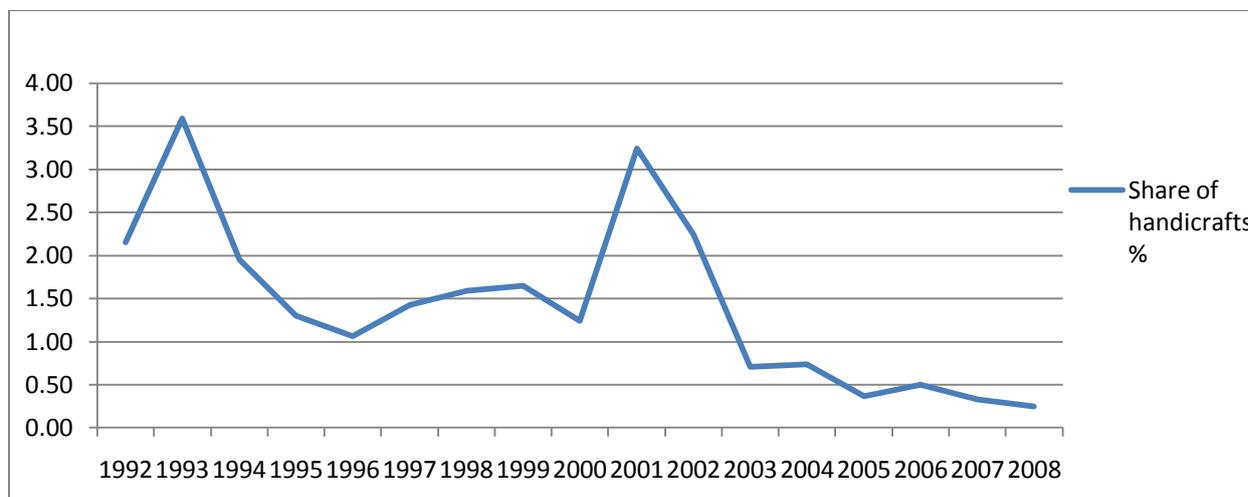
<sup>14</sup> The European Union's Everything But Arms program is an initiative of the European Union under which all imports to the EU from the least developed countries—with the exception of armaments—are duty free and quota free.

<sup>15</sup> [http://www.agoa.info/index.php?view=trade\\_stats&story=all\\_groups](http://www.agoa.info/index.php?view=trade_stats&story=all_groups).

<sup>16</sup> UN (2003), Investment Policy Review for Ghana.

value. Over about two decades the share of handicrafts in Ghana’s nontraditional exports has been declining (Figure 1.1).

**Fig. 1.1-Share of Handicrafts in Nontraditional Exports**



Source: Ghana Export Promotion Council

The United States is Ghana’s biggest market for handicrafts followed by the European Union particularly Germany, Italy and the U.K. However, recently, most buyers have turned their attention to other countries because some Ghanaian exporters do not deliver on time and most products are repetitions of old designs. For instance, Bolga baskets are losing their markets to Asian competitors particularly from Vietnam who mass-produce at lower cost.<sup>17</sup>

## 1.2 Objectives

The research objective is to determine the current and potential future contributions of the basket and wood handcraft and furniture sectors to employment and income generation in Ghana.<sup>18</sup>

## 1.3 Theoretical and Methodological Issues

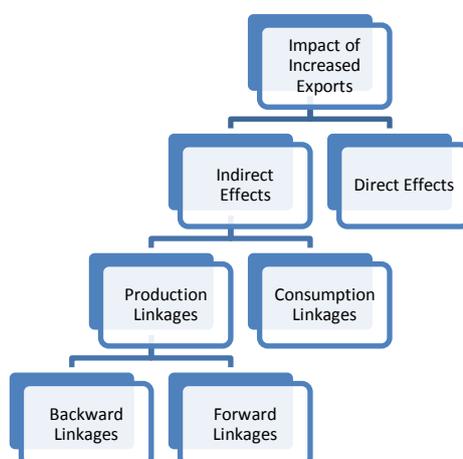
### 1.3.1 Introduction

Increased exports result in direct and indirect impacts on the economy at the sector level and eventually the national level. The indirect effects are of two types, namely, the production and consumption linkages. The former can be broken up into backward and forward linkages as summarized in Figure 1.2.

<sup>17</sup> <http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=180536>

<sup>18</sup> The scope of work for the Department of Economics, University of Ghana is set out in Attachment A in the Appendix to this document.

Fig. 1.2- Economic Linkages



The first round effects induce fresh additional demand for goods and services to give second round effects which go on and on. However the round-by-round effects become progressively smaller and eventually cease. Multipliers add up all these multi-round effects and generate a higher impact than the direct effect alone.

The analytical techniques be employed in the study were based largely on previous studies by Bromley (1972, 2009) but also on that by Pagoulatos et al (1986). Bromley’s 1972 study elaborated the concept of internal purchases and sales with regard to the flow of goods and services within an economy. In the more recent work, Bromley (2009) developed a simple regional multiplier model for estimating the effects of exports on household incomes in a rural economy.

### 1.3.2 Internal indices of Purchases and Sales

Based on the seminal work of Leontief (1951) and others, input-output models have been widely used for studying the interdependence of sectors within an economy. Bromley (1972) showed that internal indices of purchases and internal indices of sales also provide information on the extent to which inter-sectoral linkages transmit impacts throughout the different sectors of the economy and that they can be used as a computational short-cut alternative to measuring interdependencies within an economy.

The index of internal purchases is defined as 
$$u_j = \sum_{i=1}^m a_{ij}$$
 where the  $a_{ij}$ s are the technical coefficients from an input-output matrix with  $m$  endogenous sectors.  $u_j$  is the proportion of each currency unit (cedi) of output from sector  $j$  spent within the economy for intermediate goods, services, and labor to be used in further production.

On the other hand the ratio 
$$X_i = \sum_{j=1}^m a_{ji} X_j$$
 the index of internal sales<sup>19</sup>, measures the extent to which a sector's output  $X_i$  is used in further production of goods and services within

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<sup>19</sup>  $n$  represents the number of columns in the endogenous part of the model ( $m=n$ ).

the economy relative to the proportion exported or designated for capital formation (Pagoulatos et al (1986)).<sup>20</sup>

An advantage of the use of internal indices, as noted by Bromley (op.cit.), is that the data requirements for computing internal sales and purchases are much more tractable than those required for complete input-output analysis. Specifically, data required to calculate internal indices, need only include the proportion of total input purchases made internally and the proportion of total sales to intermediate use, weighted by the relative size of sampled to unsampled firms and the relative significance of each sector.

Bromley further notes that the indices of internal sales and purchases can be used to arrange the sectors of the economy within a four-group format that sheds light on which activities are prime movers for sector interdependence. For example, the sectors with high internal sales and purchases include those that are highly interrelated with the rest of the economy. These have high income and employment effects because of significant indirect effects. On the other hand the sector with low purchases and low sales are those which import much of their input requirements and likewise export much of their output. Finally, Bromley showed both theoretically and empirically that the index of internal purchases is a reasonable substitute for the traditional output multipliers in input-output models.

### 1.3.3 Estimation of Sub-National Level Income and Employment Multipliers

Drawing on several earlier studies, Pagoulatos et al (1986) observed that when an input-output table is available at, say a national level, reliable sub-national level income and employment multipliers can be obtained with a few calculations. Sectoral output, income, employment, and household consumption information at the sub-regional-level increases the accuracy of the estimation.

Following their analysis, let  $A^c$  be a  $[(m - v) \times (n - v)]$  matrix, where  $v$  is the number of sectors of the  $(m=n)$  national level endogenous sectors which do not exist at the sub-national level. Let  $B$  be the Leontief inverse matrix  $(I - A^c)^{-1}$  with elements  $b_{ij}$ . These elements represent the direct and indirect effects on output of the  $i^{th}$  sector from a change in the final demand of sector  $j$ .

Furthermore:

Let  $H$  be the  $1 \times (n - v)$  row vector whose elements,  $h_{oj}$  are the ratios of the sub-national household services purchased by the  $j$ -th sector to the total  $j$ -th sector input.

Let  $F$  be the  $(n - v) \times 1$  column vector whose elements  $f_{io}$ , are the sub-national consumption coefficients of the household.

Let  $g$  be the county intra-household consumption coefficient.

Let  $h_{oj}$  be the ratio of the sub-regional-level household services purchased by the  $j^{th}$  sector to the total  $j^{th}$  sector input and

Let  $p_{oj}$  be the county-level direct employment coefficients per currency unit (cedi) of output of the  $j^{th}$  sector.

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<sup>20</sup>

=demand in the  $i$ -th sector.

Then according to Pagoulatos et al (1986), the direct and indirect income multipliers (Type I multipliers),  ${}_1m_i$ , are obtained as the ratio of the direct plus indirect income effects to the direct income effect:

The Type II income multipliers (direct, indirect and induced effects) can be obtained as a multiple of a constant term  $\theta$  of the Type I income multiplier:

$$= \theta$$

where  $\theta$  is a scalar and is given by:

$$\theta = [1 - (g + HBF)]^{-1}$$

The Type I employment multiplier,  ${}_1e_j$ , can be obtained as

And the Type II employment multiplier ( ${}_2e_i$ ) is given by a multiple  $\phi$  of the Type I employment multiplier where:

$$\lambda = \Pi B \Phi [1 - (\gamma + HB\Phi)]^{-1}$$

and

### 1.3.4 The Regional Income Multiplier Model

Bromley (2009) developed a simple regional income multiplier model for estimating the household income effects of export promotion activities in a rural economy. In the model, regional income is derived as:

$$Y = \frac{1 - a_{nm} v_t + a_{nt} v_n \bar{T} + v_n K_n}{1 - a_{nm} - \beta_n v_n (1 - s)}$$

The equation shows total regional income as a fraction of the Leontief coefficients multiplied by the shares of gross output in both tradeables and non-tradeables. The tradeable output and non-tradeable considerations are captured by  $K_n$  and  $\beta_n$ , the former being a composite parameter representing government demand, investment demand by regional firms as well as autonomous household demand and the latter the marginal proportion of total expenditures devoted to the purchase of non-tradeables. The other parameters of the model include  $v_n$ , the (fixed) share of gross output in non-tradeable output,  $a_{nm}$  and  $a_{nt}$  which are parameters related to intermediate demand, and  $s$  representing leakages from income.

Under a further set of simplifying assumptions, the multiplier showing the effects on regional income from an increase in the production of tradeables in the regional economy is then derived as:

$$M = \frac{1}{1 - a_n - \beta_n v(1 - s)}$$

where:

$a_n$  = the Leontief Coefficient for intermediate demand

$\beta_n$  = the marginal (incremental) share of total expenditure on non-tradeables

$v$  = the share of gross output in the regional economy that goes to household income

$s$  = leakage from the regional economy in the form of taxes and savings

The models summarised above constitute the basis for the quantitative analysis carried out in this study. The study applied the results of the studies described above to examine inter-sectoral linkages in the Upper East and Ashanti Regions of Ghana. Specifically, the study computed the income and employment multipliers for the two regions.

### **1.3.5 Survey of Basket and Wood Handcraft and Furniture Sectors**

The study carried out surveys of the basket, wood handcraft and furniture sectors. The basket survey focused on baskets as a farm household decision-making process in the Bolgatanga area (Upper East Region). In this context the research team examined enterprise choices, labor and capital allocation, acquisition of inputs, credit and other supplies, marketing channels, etc. The labor time involved at the different stages of the production process and the time involved in making baskets was calculated. A similar exercise was carried out for the wood handcraft/furniture sector in Kumasi (Ashanti Region).

The research team studied the characteristics of both sectors. In addition, it investigated sector associations, extension services and the role of non-governmental organisations. The information obtained from these surveys provided insights into the value chains of the basket and wood carving/furniture sectors.

### **1.3.6 Data Required for the Study**

Data for the study was mainly obtained from the following sources

- The Ghana Social Accounting Matrix - SAM 2005
- The Ghana Living Standards Survey, Round Five - GLSS 5
- Ghana Industrial Census, 2003
- Survey of Basket Sector in Bolgatanga and Wood Handcrafts in Kumasi

## **1.4 Outline of Report**

The rest of the report is in four chapters. Chapter 2 provides a discussion of the survey conducted on the basket and straw products sector in the Bolgatanga municipality for various actors in the value chain. Chapter 3 does the same for the wood carving/furniture sector based primarily in the Kumasi metropolitan area. Chapter 4 makes use of various data sources including the survey to calculate the internal index of purchases, income and employment multipliers for the Upper East and Ashanti Regions. The final chapter states the research team's conclusions and recommendations.

## 2. Survey of the Basket Sector

### 2.1 Introduction and Background

Basketry is a handcraft found throughout the country, the choices and styles are many and varied. Each region and people has its own style of weaving, colour, pattern and general design which make it unique. The Ghanaian basket-handcraft industry is a highly labor-intensive cottage-based industry which is especially prominent in the Upper East Region. Numerous artisans are engaged in this sector on a full time or part-time basis. The Bolgatanga Basket Weavers Co-operative Club (BBWCC) provides employment to about 1,000 weavers in the Bolgatanga Municipality of the Upper East Region. The basket/straw products sector is predominately dominated by women in the actual production phase while the transportation and marketing sides are dominated by men. The handcraft industry which includes the production of straw baskets and hats, leather tanning, leather bags and hats, smock weaving has put Bolgatanga's name on the world tourism map. It is a major source of cash earnings for many local inhabitants. Most of the straw and leather products are either exported to other parts of the country or abroad, particularly Western Europe and the United States.<sup>21</sup>

The sector has high potential for self-employment and improving livelihoods in the area. The sector is characterised by low capital investment, a high share of value addition, export demand with high potential for foreign exchange earnings. In effect the potential for improved livelihoods in the Bolgatanga area is very high because of the existence of this industry.

In context, the Bolgatanga is the capital of Ghana's Upper East Region—a region characterized by serious challenges. In Table 2.1 the research team notes that Ghana's Upper West Region has the highest poverty headcount ratio of 87.9% in the country followed by the Upper East Region at 70.4% using the GLSS for 2005/2006. In 1991/92 the headcount ratio ( $P_0$ ) for the Upper East Region was 66.9% and rose to 88.2% in 1998/99 while the severity and depth of poverty ( $P_1$ ,  $P_2$  respectively) also increased. Between 1998/99 and 2005/06 headcount poverty fell by 17.8 percentage points to 70.4%.

**Table 2.1: Indices of poverty by region, 1991/92 to 2005/06, (Poverty line = 3,708,900 cedis or GH¢370.8)**

<b>GLSS3 1991/92</b>	<b>- Population Share</b>	<b>Welfare</b>	<b><math>P_0</math></b>	<b><math>P_1</math></b>	<b><math>P_2</math></b>	<b><math>P_1/P_0</math></b>
Ashanti	15.9	5531.6	41.2	12.9	5.6	31.3
Brong Ahafo	11.8	3945.9	65	22.8	10.2	35
Northern	9.5	3628.9	63.4	29.9	17.2	47.1
Upper East	5.6	3392.4	66.9	28.7	15.2	42.8
Upper West	3.1	2460.7	88.4	41.3	23.3	46.7
All	100	4660	51.7	18.5	8.8	35.7
<b>GLSS4 1998/99</b>	<b>- Population Share</b>	<b>Welfare</b>	<b><math>P_0</math></b>	<b><math>P_1</math></b>	<b><math>P_2</math></b>	<b><math>P_1/P_0</math></b>
Ashanti	16.8	7317.9	27.7	8.5	3.7	30.5
Brong Ahafo	8.7	5585.9	35.8	9.8	3.9	27.2
Northern	10.2	3571.5	69.2	29.9	15.5	43.2
Upper East	4.5	2318.8	88.2	44	25.1	49.9

<sup>21</sup> Bolgatanga municipal assembly.

<b>GLSS3 1991/92</b>	<b>- Population Share</b>	<b>Welfare</b>	<b>P<sub>0</sub></b>	<b>P<sub>1</sub></b>	<b>P<sub>2</sub></b>	<b>P<sub>1</sub>/P<sub>0</sub></b>
Upper West	3.2	2491.1	83.9	38.8	22.7	46.2
All	100	5819.4	39.5	13.9	6.6	35.2
Upper East	4.5	2318.8	88.2	44	25.1	49.9
Upper West	3.2	2491.1	83.9	38.8	22.7	46.2
All	100	5819.4	39.5	13.9	6.6	35.2
<b>GLSS5 2005/2006</b>	<b>- Population Share</b>	<b>Welfare</b>	<b>P<sub>0</sub></b>	<b>P<sub>1</sub></b>	<b>P<sub>2</sub></b>	<b>P<sub>1</sub>/P<sub>0</sub></b>
Ashanti	16.8	8284.9	20.3	5.2	1.9	25.8
Brong Ahafo	9.2	6718.2	29.5	7.8	3	26.4
Northern	12.2	4779.8	52.3	20.7	10.5	39.6
Upper East	4.8	3409.3	70.4	32.7	18.4	46.5
Upper West	3.6	2354.4	87.9	48	30.2	54.6
All	100	7627.7	28.5	9.6	4.6	33.6

Source: Ghana Statistical Service (2007)

Bolgatanga is sited in a region with erratic rainfall and stony land, seasonal food shortages and a long dry season (October-March). The expansion of non-farming economic activities therefore may have beneficial effects on livelihoods and provide a means for augmenting the income stream of some residents.

Table 2.2, gives data from the National Industrial Census on the baskets/straw sector and indicates that the total number of persons employed in the basket sector under registered enterprises was 1,151 in 2003.

**Table 2.2: Production, Earnings and Employment in Basket Handcraft Sector**

<b>Indicator</b>	<b>Baskets/Straw Products Sector</b>
No. of enterprises with ≥ 10 employees	73
No. of enterprises with <10 employees	173
No. of persons engaged in enterprises with ≥ 10 employees	630
No. of persons engaged in enterprises with < 10 employees	521
Production volume (units or pieces)	19,066
Total Earnings (GH¢)	132,700.00

Source: Extracted from the National Industrial Census 2003

Though the size of this sector is small its usefulness for improving incomes in the context of the Upper East Region cannot be discounted.

## 2.2 Basket Value Chain Characteristics

The functions of market actors in the value chain include:

1. Raw materials supply—this includes the supply of straw from the Ashanti and Brong Ahafo Regions. In addition the provision of inputs such as dyes, thread, leather components (for basket handles) and cutters
2. Production—mainly of baskets and other straw products (such as hats and mats)
3. Product consolidation—quality control and packaging
4. Marketing—either locally (in the local Bolgatanga market, Bolga Craft village or in other Ghanaian towns) or for export.

The key value chain market actors are:

1. **Producers** - who may be -
  - a) Households- where mainly female members do the weaving of the products, while dyeing may be made by male or female members.
  - b) Small-sized cooperatives of five or more persons engaged in the production process and product consolidation operations.

The main producers in Bolgatanga were these cooperatives not households.

2. **Agents or Production contractors**—who supervise production and offer some quality control and marketing services. Some NGOs also perform this role.
3. **Transporters**- these are truck-drivers or driver-owners who transport straw and other inputs from Kumasi or Techiman to Bolgatanga and then those who send finished products to local markets or to ports for export. In the Bolgatanga area there are no organised transport groups for hauling inputs for the production of baskets and other straw products.
4. **Suppliers**—these are businesses or people who sell inputs to basket producers.

## 2.3 Survey Report for Basket Producers

### General Sample Characteristics

The research team interviewed 71 basket producers in the Bolgatanga area. In terms of the sample, all basket producers were women—their average age being 37 years—who usually worked in small groups with women from neighboring households. Men involved in the production were into the dyeing aspect of the process making various colors through the mixing dyes. These men moved from group to group mixing dyes to produce the colors for the weavers. Some were contracted by NGOs to assist the groups in this respect. Table 2.3 gives the various suburbs where the producers worked. The average number of people in their household was eight persons.

**Table 2.3: Producer's Characteristics**

Characteristics	No.
Sample size	71
Bolgatanga-Nyariga	13
Bolgatanga-Sokabisi	21
Bolgatanga-Submrungu	1
Bolgatanga-Tongo	1
Bolgatanga-Tonosogbu	1
Bolgatanga-Zaare	33
Bolgatanga-Zuarungu	1
No. of producers < 18yrs	1
Maximum Age	55
Minimum Age	12
Mean age in years	36.8
Mean No. of people per household of producers	8
Mean No. of females per household	6

Source: Survey

The most important activity for producers and their households was farming. Second was the making of straw products such as baskets and hats. The other economic activities were trading and wage employment.

### Income of Basket Producers

The average 2009 total sales of the basket producers was GH¢ 723.30 (Table 2.4) while the cost of inputs (purchases) used for basket making was GH¢ 218.61. The average gross margin obtained after deducting the input costs is GH¢ 483.10 which is the gross income earned from straw products.

**Table 2.4: Income of Producers (GH¢)**

	Sales	Purchases	Gross Margin
Mean	723.30	218.61	483.10
Standard Error	70.55	21.37	55.72
Median	528.00	167.50	386.00
Mode	180.00	190.00	215.00
Sample Size	68.00	67.00	67.00

Source: Survey. Note: Some respondents adequately answered on incomes but not on costs and vice versa.

### Prices and Time spent on Production

Time spent per day on making straw products averaged six hours per person. During production days much of the working day was spent making these products. In terms of prices, for the main products the average prices obtained at in Bolgatanga are given in Table 2.5. Prices paid by agents who deal with exporters or market the products in other places in Ghana were higher than those obtainable in the local market on market days during the period.

**Table 2.5: Prices of Straw Products**

Shape of (base of) Basket	Local market price GH¢	Agent's price GH¢
Round Baskets	4.7	7.5
Oval Baskets	3.78	7.96
Square Baskets	5.93	8.44
Laundry Basket	16.67	11.32

Source: Survey

### Expenditure Profile of Producers

For Table 2.6 producers' expenditure was analysed as a proportion of total expenditure and also as a percentage of the gross income from straw products. The latter forms only part of their total earnings for 2009. Most respondents earn some income or imputed income from agricultural activities. Each respondent's total expenditure was computed and from the amount spent on various expenditure categories given by respondents, the proportion spent out of the total was calculated. The averages of these shares are given in the second row of Table 2.6. The same procedure was applied to calculate the share of various expenditures out of straw income.

**Table 2.6: Share of Total Expenditure for Producers (%)**

	Food	Education	Clothing	Social	Church	Medical	Saving
As a %age of Total Expenditure	51.9	9.4	18.1	6.5	0.3	10.5	3.3
As a %age of Total Sales from Straw	57.0	5.6	15.2	5.7	0.3	5.8	1.8

Source: Survey. Note: Producers income from straw products  $\neq$  total expenditure.

The data on taxes were on per market day basis. Most commonly reported was the District Assembly Levy—0.50 GH¢ per straw product while that for market tolls was 0.20 GH¢ per market day.

### Services

Of the basket producers 28% belonged to a susu group which is a rotating savings association. About 45% of respondents reported receiving assistance from NGOs in many forms. These included microfinance, skills training and dyeing procedures. Some NGOs also assisted in the marketing of products by securing international orders.

### Hindrances to Production

The most important factors confronting producers are summarized in Table 2.7—they cited difficulty in obtaining inputs as the most important challenge. The second most important factor was the lack of good storage facilities for both inputs and finished product. In a few areas in Bolgatanga (Zaare, Sokabisi and Nyariga) NGOs had built one facility each to assist producer groups.<sup>22</sup> These facilities at a minimum had a space for weaving, an office and a storage facility. The other factors were inadequate capital and social activities like funerals.

**Table 2.7: Challenges faced by Producers**

Issue	Rank	%age of responses to each issue
Difficulty in Obtaining inputs	1	24.1
Lack of or poor storage facility	2	24.6
Social activities—funerals etc.	3	26.2
Inadequate capital	4	61.2

Source: Survey

Some NGOs are heavily involved in production or in both production and marketing in foreign markets. In other cases agents linked to exporters in Accra place orders depending on requests from their foreign contacts to buy from these producer groups. Otherwise sales are made at the main Bolgatanga market.

### Credit

Credit for about 70% of producers was from an NGO very active in the sector. Table 2.8 reveals that there was some credit rationing as less than half of the amount requested was granted. The average annual loan rate was about 30% with a facilitation fee charged amounting to 3% of the loan amount.

**Table 2.8: Credit obtained (GH¢)**

Credit(GH¢)	Amount requested	Loan granted	Period (months)	Annual loan rate
Mean	146.60	57.00	6.72	29.92
Standard Error	14.72	4.52	0.50	0.06
Median	100.00	50.00	6.00	30.00
Mode	100.00	50.00	6.00	30.00
Sample	50.00	50.00	50.00	50.00

Source: Survey

### Outlook

Producers of baskets/straw products were alert to market conditions. Table 2.9 shows the main supply responses to a hypothetical significant increase in prices would be to: introduce new designs; increase production; ensure better quality and use better inputs.

<sup>22</sup> Trade Aid an NGO has two work centers. The U.S. Blessing Basket Project (BBP) supported the building of a crafts centre at Nyariga near Bolgatanga.

**Table 2.9: Major Effect of a Large Price Increase**

Major Responses	No.	% of Producers
Introduce more designs	17	25.37313
Ensure better quality	14	20.89552
Use better inputs	8	11.9403
Increase size of product	8	11.9403
Increase production	15	22.38806

Source: Survey. Note: N = 67, where N relates to sample size. Only major commonly responses were reported.

Likewise the effect of a significant decline in prices was as expected. Table 2.10 captures the negative response to this event. Thus producers are rational in their economic reasoning and will respond positively to policy or price incentives. Policy incentives can make the environment suitable for them to reduce input costs through for instance easier loan granting, reduced transport costs and exposure to better designs.

**Table 2.10: Major Effect of a Large Price Decrease**

Major Responses	No.	%
One design only	16	23.9
Use inferior inputs	7	10.4
Decrease size of product	21	31.3
Decrease production	10	14.9
Stop production	3	4.5

Source: Survey. Note: N = 67, where N relates to sample size. Only major commonly responses were reported.

## Other Issues

Even though earnings in the straw and leather works sector appear to be higher than in compound farming, it is predominantly an off-farming season activity in the area. Government and local authorities acknowledge this activity, as evidenced by the provision of the Bolga Crafts Centre by Government. Ghana Export Promotion Centre also has a zonal office in Bolgatanga.<sup>23</sup>

Nevertheless, the initiative to assist and increase quality production is private-sector driven. Official support is minimal. The local authorities which collect the market tolls and levies are responsible for the provision of market sites. Action to provide suitable congenial market sites is necessary given the challenges enumerated by the producers. It may be prudent for the municipal authority to build other markets and craft centers in other suburbs. Another relevant matter is good storage facilities—which can be tackled by the provision of a suitable warehouse within these markets.

Given the general low income levels of residents in the area and the informal nature of the basket industry, banks are unwilling to lend—but the space is there for microfinance institutions to do so. The Upper East Region is home to 16 organizations who are registered members of the Ghana Microfinance Institutions Network (GHAMFIN) while rural banks

<sup>23</sup> The Ghana Export Promotion Council (GEPC), which facilitates the development and promotion of Ghanaian exports has a number of zonal offices in various regions in Ghana.

also provide some loans to small scale enterprises in their catchment areas.<sup>24</sup> Funds from government or international development agencies could be channeled through such bodies. Another problem raised by producers was the difficulty of getting straw in the area which can be traced to bushfires and the long dry season. Thus straw has to be imported from the Ashanti or Brong Ahafo Regions, making the cost of production higher and causing delays in production. Producers reported that decades ago suitable straw was locally available. The growing of suitable grasses for the industry is a viable activity given that straw prices are reported to have doubled within the last two years.

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<sup>24</sup> <http://www.ghamfin.org/>

## 2.4 Survey Report for Input Suppliers

### General Characteristics

Those who supply inputs to the basket sector are not predominately women. It is a more mixed group. Input suppliers' mean age was 37 years—they were usually married and had about 12 members in their households out of which six were women.<sup>25</sup>

**Table 2.11: General Characteristics**

	Age	Adults in Household	No. of women in Household
Mean	37.0	12	6
Standard Error	1.0	3	2
Median	36.0	9	3
Mode	32.0	5	2
Sample	29.0	30	31

Source: Survey

### Supply Activities

The inputs suppliers are mainly found in the commercial part of Bolgatanga around the central market. Even though they sell inputs for the handicrafts industry they also sell other products. Hence they are actors in the handcraft value chain but not necessarily exclusive to the production of straw products. Their major activity was trading followed by farming activities. The main inputs sold for the straw products industry are straw, dyes and leather.

### Input Prices, Sales and Costs

All input dealers reported that they obtained their straw supply from Kumasi (meaning Ashanti or Brong Ahafo). The straw dealers usually went to Kumasi themselves or engaged someone to do so. On average as at April 2010 the “normal” size of straw was GH¢ 1 in Kumasi and sold for GH¢ 2 on the Bolga market. Powdered dyes were sold in small plastic bags for GH¢ 0.50 at Bolga and GH¢ 0.30 in Kumasi.<sup>26</sup> Dyes were also used by textiles and smock producers. In terms of standard measures on the Kumasi market 1 kg of powder typically cost GH¢ 40.00 and GH¢ 60.00 at the Bolgatanga market.<sup>27</sup> Leather handles and over pieces were sold at various prices depending on their size or function.

Purchases of straw supplies amounted to 80.19 bundles on average and in total 2,165.00 bundles, while those for dyes were 32.14 kg and in total 450 kg for the season. These and other statistics are shown in Table 2.12.

<sup>25</sup> One respondent insisted that there were 80 people in her household.

<sup>26</sup> Same modal and median prices.

<sup>27</sup> Same modal and median prices.

**Table 2.12: Quantities and Prices of Main Inputs for Straw Products Sector**

	Quantity of Straw	Kumasi Price per Bundle (GH¢)	Straw Price per Bundle	Bolga Price per Bundle	Quantity of Dye (kg)	Kumasi Dye Price (GH¢)	Bolga Dye Price (GH¢)
Mean	80.19		1.30	2.27	32.14	35.74	54.63
Standard Error	23.67		0.14	0.22	7.03	1.75	2.89
Median	43.00		1.00	2.00	17.50	38.75	60.00
Mode	100.00		1.00	2.00	10.00	40.00	60.00
Standard Deviation	140.01		0.81	1.29	41.59	10.36	17.11
Variance	19,602.93		0.66	1.67	1,729.67	107.42	292.60
Range	744.00		4.00	6.90	145.00	39.70	59.50
Minimum	6.00		1.00	1.10	5.00	0.30	0.50
Maximum	750.00		5.00	8.00	150.00	40.00	60.00
Sum	2,165.00		38.90	59.10	450.00	500.30	655.50
Sample size	27.00		30.00	26.00	14.00	14.00	12.00

Source: Worksheets

From these prices and quantities, purchases and sales were calculated for each respondent reporting. Nevertheless the research team found that these may not exactly equal values computed directly from Table 2.12 as some of the respondents did not reply. The mean level of purchases for the period was GH¢ 685.13 while the monthly wage bill was GH¢ 105.29. Total sales by suppliers at the Bolgatanga market, is given in the third column of Table 2.13. It has an average of GH¢ 1,090.52.

**Table 2.13 Purchases and Wage bill (GH¢)**

	Wage bill per month	Annual Wage bill	Total sales by suppliers	Total purchases by suppliers	Gross margin
Mean	105.29	1,263.43	1,090.52	685.81	404.71
Standard Error	22.78	273.40	420.04	261.47	158.75
Median	48.00	576.00	330.00	232.75	112.25
Mode	48.00	576.00	NA	NA	25.00
Standard Deviation	134.79	1,617.48	2485.00	1546.90	939.20
Variance	18,168.37	2,616,245.80	6,175,227.42	2,392,887.80	882,104.19
Range	476.00	5,712.00	12,363.00	7,719.00	4,647.00
Minimum	24.00	288.00	12.00	6.00	3.00
Maximum	500.00	6,000.00	12,375.00	7,725.00	4,650.00
Sum	1,474.00	17,688.00	26,172.50	16,459.50	9,713.00

Note: main purchases include straw, dye and leather costs

Their average gross margin was GH¢ 404.71 for a month. This represents gross income coming to input suppliers. Respondents stated that the most important challenges they face in

their line of work, were lack of capital, difficulties in transporting purchases from Kumasi and lack of adequate storage facilities.

## 2.5 Survey Report for Transporters

The difficulty in obtaining suitable transport is due to the lack of any strong cargo transport association dedicated to the basket haulage business—unlike the case for the cashew sector. Agents who wish to send cargo, usually to Accra and Tema port, use transporters. Transporters complained that this type of business was intermittent and of insufficient quantities for them to be exclusively dedicated to it. They took whatever cargo was available.

Secondly there were not many cargo trucks based in Bolgatanga or in the Upper East Region generally. Trucks based in southern Ghana—usually Kumasi, Accra or Techiman—brought in goods to Bolgatanga or came on contract to cart tomatoes back. The few trucks sometimes used by marketing groups or agents were either partially-filled Burkinabe trucks carting goods from Tema or trucks which had off-loaded their goods at Bolga and were returning to Accra empty. Indeed, only a few transporters were keen to actually fill questionnaires. Five transport union officials at the Bolgatanga lorry park cooperated and discussed issues pertaining to their business and helped to provide some answers. Three others who had transported for the Nyariga Craft Centre also provided some information.

**Table 2.14 Cost of Operating Transport Business**

Type of cost	Amount GH¢	As a %age of income from straw products in Feb. 2010
Payment for purchase of vehicle	60,000 (with 20 footer container)	6,315.789
Insurance	120	12.6
Fuel and oil per trip	312	32.8
Maintenance per trip	150	15.8
Hired labor e.g. Driver's mates per trip	70	7.4
Tyres		0.0
Tarpaulin	75	7.9
Station tolls per trip	5	0.5
District Assembly toll per trip	5	0.5
Transport union charges per trip	10% per load( average GH¢ 500 per trip)	5.3
Inland Revenue Service per quarter	With clearance certificate you don't pay	
Loading per trip	15	1.6
Unloading per trip	15	1.6
Other taxes-police	34	3.6
Other costs -customs	40	4.2

Source: Survey

The charges quoted for a filled 20 ft container load ranged between GH¢ 400 to GH¢ 600. The cost of doing business was found to be quite high, if insurance costs are put in monthly

terms then the cost of business is 82% of the income obtained from haulage of baskets. This gives transporter a margin of about 18% of their revenue.

The union officials reported that transporters hauled baskets to Tema port or the Accra Arts Centre. The distance from Bolgatanga to Accra Arts Centre was 510 miles while from Bolgatanga to Tema port was 523 miles. The road condition was described generally as fair but bad in some portions. Table 2.15 provides details of illegal fees taken from transporters —these values were about the average of those reported by other value chain actors.

**Table 2.15: Illegal Fees and Delays at Checkpoints**

Accra to Tema port – Type of checkpoint	Average # of checkpoints per trip	Average delay at checkpoint	Average fee paid at checkpoint)	Average travel time (including stops))
Police - Bolga to Tema port	17	20 min.	2	19 hrs
Customs - Bolga to Tema port	8	25 min.	5	19 hrs
Police - Bolga to Accra Arts Centre	15	20 min.	2	18 hrs
Customs - Bolga to Accra Arts centre	6	20 min	5	18 hrs

Source: Transport Union officials at Bolgatanga

Police and Customs delayed transporters by 20 to 25 minutes at checkpoints in the guise of inspecting cargo for contraband items. Typically the police collected GH¢ 2.00 per checkpoint while customs officials collected GH¢ 5.00. These illegal fees amounting to about GH¢ 74 per trip were nearly equivalent to 8% of their income per trip, further reducing their profit margin from 18% to 10% of the income from basket haulage. Other challenges transporters reported were high maintenance costs and bad portions of the road to Accra.

## 2.6 Survey Report for Agents

The agents/exporters who participated in the survey operated as registered companies and had identifiable offices in Bolgatanga. Agents deal with Accra-based firms or export directly overseas. In 2009, the popular destination for basket exports were United States and Western Europe especially Germany. A total of 34,400 pieces were exported in the last orders obtained by the five agents interviewed in Bolgatanga. Export prices (wholesale) ranged between GH¢ 7 and 14 (about US\$ 5 to US\$ 10) per unit. Agents obtained baskets mainly from contracted organized groups. When it was necessary to fulfil orders quickly, purchases were made from the market or direct from individual producers if the quality of products was good.

In terms of value added, agents reported having workers to put leather parts on the products. Their main complaint was the inconsistency in quality and sometimes delays by producers. Aside from that, issues hindering their business were lack of storage space, financial constraints, lack of transportation, delays at checkpoints on the highways. These problems hindered fulfilling orders in a timely manner. Overall the agents/exporters in Bolgatanga reported that they had 681 people contracted by them for their last orders.

Bank credit was apparently available to agents and they reported loan rates between 28% and 30%. The main government agency providing business advisory services to agents was the

National Board for Small Scale Industries (NBSSI). Market information and orders were obtained through the internet or from other agents in Ghana. On average their last order brought in on average GH¢ 6,911.80 or a total of GH¢ 34,559.00.

In terms of the assistance needed to enhance their business activities, agents reported the following issues: larger amounts of credit to enable them buy more products to fulfill large orders; the provision of more craft centers to encourage production in congenial settings; the mounting of trade fairs even at the local level to showcase the products available; and the need for producers to introduce new designs at regular periods.

## **2.7 Conclusion**

Women dominate the production of baskets and other straw products. Production is conducted mainly during the dry season when there is reduced farming activity and is mainly centred on small groups or associations. The margins earned make it a viable industry but rising costs of major inputs such as straw and imported dyes are a threat. For the export market these considerations are important because of competition from Asian producers of similar products.

Given the endemic poverty in the Upper East Region and the threat from overseas competitors, policy action to reduce the cost of production is vital. Simple action such as growing the right type of straw in the nearby Veia irrigation catchment area near Nyariga could reduce dependence on supplies from the faraway Ashanti Region. Efforts to tackle this problem may help make basket making a year round serious commercial activity.

The lack of suitable and readily available cargo trucks to cart baskets to the Accra market and for export is another serious issue. This problem also affects the haulage of straw and other inputs from Kumasi to Bolgatanga. The local authorities or interested NGOs could lease a few trucks and operate them exclusively for haulage of basket inputs and finished products for a fee. The incentive for this action is the significant revenue municipal authorities could receive from the sector in terms of market tolls, landing fees and district levies.

### 3. Survey Report for Wood Carving and Furniture Sector

#### 3.1 Introduction

In Ghana, wood products exports contribute significantly to the nation's economy. It is the fourth highest foreign exchange earner, having provided around 12% of Ghana's foreign exchange between 1990, 2003 and 2006 (Lebedys, 2004; Ghana Forest Commission, 2006). In terms of employment, the sector employs quite a sizable number (mostly in the informal sector) of the Ghanaian population implying that a large number of the Ghanaian population gets their incomes from the wood sector. Statistics from Ghana industrial census (2003) indicates that wood carving and furniture production employs about 39000 people nationwide and about 7000 people in Ashanti region.

Activities in the wood sector can be classified into three main categories:

- (i) Primary activities
- (ii) Secondary activities and
- (iii) Tertiary activities.

Primary activities are those involved in cutting the trees from the forest while secondary and tertiary activities are those that involve value addition. Wood sector activities are mostly concentrated in certain parts of the country. For example, most carving activities are undertaken in Ahwia a suburb of Kumasi, while most furniture activities are undertaken in Anloga, another suburb of Kumasi.

In recent times, calls have been made on policymakers to pay attention to the wood sector because it is believed that the sector is not properly organized and as a result its full potential is not being achieved. Experts in the sector believe that wood and its composites have a high percentage of businesses with growth potential. It is believed that a better-organized sector will improve the country's exports—increasing employment yearly and supporting a livelihood of over three million people (SPEED, Ghana).<sup>28</sup>

According to the experts the most critical barriers to small companies in the wood sector are limited human capacity in terms of technical, business and marketing competencies, limited access to finance and access to markets.<sup>29</sup> They believe the sector also lacks appropriate working premises and an easier enabling environment for companies to start, develop and grow their businesses. This results in low efficiency, high waste, low income, less employment, poor quality of products and thus minimum returns on investment. The experts are of the opinion that, the key thrust towards the development of the sector, therefore, is in generating a more favorable climate for doing business and fostering synergies among the various players in the sector.<sup>30</sup> It is in this vein that the West Africa Trade Hub organized a study to analyze the income multipliers of the wood sector with emphasis on the furniture and carving sub-sectors. This study goes a long way to help policy makers know how one cedi generated from the sector impacts on the economy as a whole.

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<sup>28</sup> Support Programme for Enterprise Empowerment and Development (SPEED) Ghana facilitates the development of the financial market and also business development services for Ghana's micro, small and medium enterprises, which contributes to their increased competitiveness. Based in the capital Accra, SPEED operates nationwide with a particular focus on supporting the Northern and more rural region.

<sup>29</sup> SPEED Ghana.

<sup>30</sup> SPEED Ghana.

## The Survey

The data used in this chapter is basically from primary sources. The primary data was obtained through a survey conducted between February and April 2010. In the survey, 116 respondents (all from the Ashanti Region) were interviewed and these respondents were selected across the various locations of furniture producers, carvers, exporters and transporters of wood products.<sup>31</sup> For the purposes of studying the value chain, the sector was broken down into four main categories namely, input producers, wood products producers, transporters and exporters. Then questionnaires were administered to each category.

Out of the 116 respondents interviewed, about 47% were wood product producers while 25% were wood input suppliers. Table 3.1 shows the distribution of respondents by category in the value chain. Only 9% of the total respondents were agents/exporters and this reflects that export of wood products is undertaken by very few individuals.

**Table 3.1: Distribution of Respondents by Category**

Category	No. of Respondents	Percentages (%)
Input suppliers	30	25.9
Products producers	54	46.6
Wood product transporters	22	19
Agents	10	8.6
<b>Total</b>	<b>116</b>	<b>100</b>

Source: Survey

## 3.2 Survey Results for Wood Input Suppliers

### 3.2.1. General characteristics of sample

The categories of people in this value chain were very difficult to find. In all 30 wood input suppliers at different locations were interviewed. Tables 3.2 and 3.3 give the gender dimensions and location of respondents respectively. As shown in Table 3.2, 60% of the respondents were females while 40% were males.

**Table 3.2: Distribution of Respondents by Sex**

	No. of respondent	Percentage (%)
Male	12	40
Female	18	60
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Survey

Wood input suppliers were drawn from various locations in Kumasi. Out of the 30 respondents, 60% were from Sokoban while 20% were from Asokore. Only one person was interviewed from Effiduasi.

<sup>31</sup> The interviews were done in the form of questionnaires administration. Each respondent was approached by a research assistant who helped them in filling out the questionnaire.

**Table 3.3: Distribution of Respondents by Location**

Suburb	No. of Respondents	Percentage (%)
Asokore	6	20
Effiduasi	1	3
Sokoban	18	60
Ahwia	2	7
Ejisu	2	7
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Survey

As shown in Table 3.4, the respondents' ages ranged between 29 and 52 years. However, the majority of them were between the ages of 30 and 50. In addition, the average age of the respondents was 38.3 years. This means that the sector is dominated by middle-aged people.

**Table 3.4: Age Distribution of Respondents**

Age	No. of Respondents	Percentage (%)
0-29	3	10
30-50	26	86.7
52 and above	1	3.3
Total	30	100

Source: Survey

### 3.2.2 Livelihoods, Revenue, Material Expenses and Gross Margins

Respondents were asked to rank the activities which form their sources of livelihood. Of the 30 respondents, 93% ranked the sale of wood products inputs as their number one activity. This tells the extent to which livelihood depends on sale of wood products inputs. The next highest rank activity was farming. None of the respondents was in waged employment.

In terms of the type of wood inputs, respondents deal in multiple products. All 30 respondents deal in rough wood cuts—6% deal in polish and 6% deal in other products. Those who deal in rough wood cuts mostly obtain their supplies from various sawmills in Kumasi, Nsuta, Dunkwa and other places. However, most rough wood cut dealers sell their product in Sokoban, Ahwia and Effiduasi.

Table 3.5 shows the average amount of inputs bought and sold by the respondents in 2009. For rough wood cuts, the average amount bought by all respondents in December 2009 was GH¢ 511.5 and the average amount sold in the same month was GH¢ 658.8. This shows that on the average, a gross profit of 147.3 was realized in December 2009 by the 30 respondents. In relation to polish, the average amount bought by all respondents in December 2009 was GH¢ 11.5 while the average amount sold was GH¢ 24.2.

**Table 3.5: Average buying and selling price per unit of input**

Input	Average amount bought in 2009 (GH¢)	Average amount sold in 2009 (GH¢)	Average gross profit margin (GH¢)	Gross profit expressed as a %age of average amount bought
Rough wood cuts	511.5	658.8	147.3	29
Polish	11.5	24.2	12.7	110

Source: Survey

In actual terms, income earned in the previous month for wood input suppliers ranged from GH¢ 18 to GH¢ 4,000 with a mean of GH¢ 949.

The most important cost item apart from transportation was payment of salaries and allowances. All respondents interviewed had at least one shop attendant, loading boys, etc. Table 3.6 shows the average monthly allowance paid to each category of workers. In 2009, on average, a shop attendant, received GH¢ 124 a month while loading boys received GH¢ 25 a month. Helpers, and designers received GH¢ 350 and GH¢ 100 respectively.

**Table 3.6: Average monthly allowance paid to employees (both in cash and in-kind)**

Worker	Average monthly allowance (GH¢)
Shop attendant	124
Loaders	25
Helpers	350
Designers	100

Source: Survey

### 3.2.3 Issues with Marketing, Credit and Taxes

With respect to credit, the result showed that wood input suppliers were not keen on applying for credit. Out of the 30 respondents interviewed only three had taken a loan in the last three years. Out of those three only one person got the full loan amount requested (Table 3.7). All three that had taken loans paid some money to facilitate the loan acquisition.

**Table 3.7: Credit Availability in 2008**

Institution	Total Amount Requested (GH¢)	Total Amount Granted (GH¢)	Duration of loan	Average Interest rate (%)	Amount paid for Facilitation (GH¢)
Rural Bank	5,000	3,000	1 year	15	10
Susu Group(ROSA)	2,000	2,000	10 month	20	37.5
Asokore Rural Bank	500	400	1 year	18	20

Source: Survey

With regard to taxes and levies, all respondents pay some form of tax to the government. The type of taxes identified were, district assembly levy, income taxes and market tolls. On average respondents pay a district assembly levy of GH¢ 7.40 a month. In addition to the

district assembly levy, respondents also pay on average income tax of GH¢ 44 and GH¢ 3.40 as market tolls. With respect to annual income, the 30 respondents' average monthly income was GH¢ 627.3 while the maximum and minimum incomes were Gh¢ 7,000 and GH¢70 respectively. This income came mainly from trading in wood products.

### **3.2.4 Challenges Confronting Wood Inputs Suppliers**

Respondents identified a number of challenges, the major one being harassment meted out to them by police, customs and Forestry Commission officials when hauling their products to sale points. To get to their final destination they went through an average of three police, five customs and three Forestry Commission barriers. At every barrier respondents were made to pay some money. At every police or customs barrier encountered, the results showed they spent an average of 15 minutes. In addition, the police were paid an average of GH¢ 84 per trip, while customs officers collected an average of GH¢ 120 per trip. These were illegal fees.

## **3.3 Survey Report for Wood Product Transporters**

### **3.3.1 General characteristics of sample**

In all, the research team interviewed 22 wood input transporters.<sup>32</sup> The proportion of income earned from hauling wood products ranged from a minimum of 5% to a maximum of 100% with a mean of about 65%. Of these respondents, about 45% earned all their income from hauling wood products.

Respondents interviewed hauled different wood products such as furniture products, carved products, rough bush cuts as well as sawmill off-cuts. With respect to the sources of wood products, transporters transport wood from various locations. Most of the transporters interviewed carted wood product materials from Oforikrom and Ahwia where there was a concentration of wood product producers.

The transporters transport wood products to different locations in Ghana, Accra being the most popular destination. In addition, transporters haul wood products from other rural areas to the producing areas.

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<sup>32</sup> It must be noted, however, that the responses for some of the variables may not be up to that number as some of the respondents failed to answer those questions.

**Table 3.8: Summary Statistics of Variables for Transporters**

Variable	No.	Mean (GH¢)	Std Dev.	Min.	Max.
Proportion of Income	18	64.48722	37.88796	5.77	100
Income earned last month	20	949.4	945.7667	18	4,000
Average number of trips per week	22	3.181818	1.942908	1	8
Total earnings from hauling wood products	21	495.2381	221.8698	250	1,000
Police checkpoint per trip	16	2.4375	1.093542	1	4
Average fee paid at police checkpoints	15	4.3333	2.829997	1	10
Total travel time	14	5.5171429	1.518186	45 mins	6.5 hours
Salary earned by drivers last month	20	201.5	57.51659	150	300

Source: Survey

### 3.3.2 Livelihoods, Revenue, Material Expenses, Gross Margins

With regard to livelihoods, most of the respondents interviewed did not depend on hauling of wood products alone. They transport all manner of products. The survey results showed that income from the transportation of wood product formed a smaller proportion of their total income. Out of the 22 respondents, only 22% of them had the proportion of income from hauling wood product as a percentage of total income as 23.81%. The rest had a figure that is below 23.81%. With respect to the income earned the previous month, majority of the respondents earned income between GH¢ 500 and GH¢ 600.<sup>33</sup> The average income from hauling wood products in the case of all respondents was GH¢ 495.23.

Respondents identified different methods of payment. These included, per truckload, per tonne, and per container. With respect to charges, they have different categories (ie 18 ft, 20 ft, 24 ft and 28 ft) with different prices charged for each container type. As shown in Table 3.9, most of the transporters charge per truckload and the maximum amount they charge per load is GH¢ 500 and the minimum amount is GH¢50. Other charges were GH¢ 440 for a 20 ft container and GH¢ 467 for a 24 ft container.

**Table 3.9: Summary Statistics for Method of Charging**

Charges	Sample Size	Mean (GH¢)	Std. Dev.	Min.	Max.
Per truckload	8	212.50	178.79	50	500
Per tone	1	100.00	n/a	100	100
Per 18 ft container	2	400.00	n/a	400	400
Per 20 ft container	5	440.00	22.36	400	450
Per 24 ft container	3	466.67	28.87	450	500
Per 28 ft container	1	600.00	n/a	600	600
Other	4	102.50	46.46	40	150

Source: Survey

<sup>33</sup> See Table A3.1 in the Appendix.

The respondents identified a number of factors that make up their costs. These included, cost of insuring their vehicles, cost of fuel, maintenance costs, labor and other costs. Table 3.10 shows the various cost items identified by transporters. As might be expected, fuel cost has the largest share in total cost followed by maintenance costs.

**Table 3.10: Components of Cost**

Cost item (GH¢)	No.	Mean	Min.	Max.
Insurance per quarter	22	45.45	25	300
Fuel per trip	21	87.358	10	150
Maintenance per trip	21	67.14	20	150
Hired Labor	22	20.91	5	50
Tires	2	2,070	1,320	2,820
Station Tolls	11	3.09	2	5
District Assembly Toll	3	2.00	2	2
Transport Union	20	7.70	1	95
Inland Revenue Service per quarter	16	19.69	5	30
Loading Fee	13	5.50	5	5
Kumasi Metropolitan Assembly	20	9.30	1	95
Road Toll	1	1.50	1.5	1.25

Source: Survey

As shown in the table, the lowest cost item is the payment transporters make at the toll booth. The maximum amount they paid per trip for highway tolls was GH¢1.5 in April 2009.

### 3.3.3 Challenges Confronting Wood Products Transporters

One of the challenges identified by the respondents is the nature of the roads. While 30% of transporters who ply the route from the various producing centers to Accra perceive the road network as good, 70% of them view it as fair, with some parts very good while other parts of the road have many potholes or are very narrow. With respect to those carting wood from the hinterlands to the producing center, (e.g. as in the case of Ejisu), they perceive the road as very bad especially when it rains.

Respondents also identified the frequency of police barriers encountered the time spent at each barrier as a challenge. For instance, those who transport wood products to Accra encounter six police barriers and spend average of ten minutes at each barrier. Beside police harassment and bad roads, they identified other constraints.

## 3.4 Survey Results for Wood Product Producers

### 3.4.1 General Characteristics of Sample

In all the research team interviewed 54 wood product producers comprising furniture producers and wood carvers. In terms of gender, all people interviewed were male, which buttresses the point that this is a male-dominated occupation. The sample was drawn from various locations in the Ashanti Region—specifically from localities such as Ahwia, Oforikrom, Oduom and Others.

Table 3.11 shows the distribution of the sample by locality. The table shows that the majority of those in the sample were drawn from Oforikrom and Ahwia. These localities are the base

for furniture producers and carvers respectively. Table 3.12 shows the distribution of respondent by type of wood product produced. As shown in the table, 43% of the respondents deal in furniture products while 57% deal in carved wood products.

With the exception of one respondent, all respondent said they have at least one household member who is above 18 years. In terms of marital status of respondents, 67% of respondents are married while 33% are single.

**Table 3.11: Distribution of Sample by Locality**

Locality	No. of respondents	Percentage
Ahwia	24	44.4
Asokore	5	9.3
Odum	2	3.7
Oduom	2	3.7
Oforikrom	15	27.8
Sokoban	1	1.9

Source: Survey

**Table 3.12: Distribution of Respondents by Type of Wood Product**

No. of respondents	%age of total
23	43
31	57

Source: Survey

Table 3.13 shows the number of household members above 18 years who are women. Out of the 54 respondents, 17% do not have women as members of their household above 18 years, while 39% of the respondents have one woman household member who is above 18 years.

**Table 3.13: Number of Household Members that are Women**

No. of women	No. of respondents	Percentage
0	9	16.7
1	21	38.9
2	10	18.5
3	4	7.4

Source: Survey

The age distribution of producers is not significantly different from the age distribution of suppliers. Most of the respondents fall within the age bracket of 30 and 39. Table 3.14 below shows the age distribution of respondents.

**Table 3.14: Age Distribution of Respondents (Wood Products Producers)**

Age	No. of Respondents	%age of total
0-29	14	26.4
30-39	27	51
40-49	8	15.1
50 and above	4	7.5
Maximum age	59	
Minimum age	21	
Average age	35.30	

Source: Survey

### 3.4.2 Livelihoods, Revenue, Material Expenses, Gross Margins

In the case of wood products producers, respondents were also asked to rank the activities they undertake as their sources of livelihood. Table 3.15 illustrates that the most highly ranked activity is the making of wood products. Of the 54 respondents, 93% ranked making wood products as their number one activity. This tells the extent to which livelihood depends on sale of wood products. None of the respondents were in waged employment, trading or other activities.

Income earned from the sale of wood products varies from the type of wood products sold. Most of the respondents manufacture more than one wood product. Table 3.15 shows the income earned in a month from the sale of wood products. The table shows that a majority of the respondents earn between GH¢ 201 and GH¢ 400 per month while very few earn GH¢ 500 and above per month.

**Table 3.15: Amount of Income Earned from Wood Products in a Month**

Income (GH¢)	No. of respondents	%age
60-200	23	45.1
201-400	24	47.1
500 and above	4	7.8

Source: Survey

In relation to employment generation, statistics from the survey shows that, most of the respondents work alone. Table 3.16 shows the number of people employed by each respondent. The table demonstrates that, 55.8 % of the 54 respondents reported that they work alone, while 34.9% reported that they employ between 1 to 5 people and only 9.3% reported that they employ 6 people and above.

**Table 3.16: Number of People Employed by Respondents**

No. of people	%age
0	55.8
1-5	34.9
6 and above	9.3

Source: Survey

The time spent on producing wood products also varies from respondent to respondent. Table 3.17 shows the number of hours a day spent by respondents on wood products. As shown in the table, 56.6% of the respondents spent 10 hours a day on wood products, while 25.9% spent 12 hours a day on wood products.

**Table 3.17: Number of Hours Spent on Wood Products a Day**

No. of hours	% of respondents
6	1.9
8	1.9
9	1.9
10	55.6
11	11.1
12	25.9

Source: Survey

The raw materials needed to make wood products depend on whether the producer is a wood carver or a furniture producer. With respect to wood carvers, raw materials are quoted in terms of trees while furniture producers quote theirs in terms of plywood, beams among others. Tables 3.18 and 3.19 show the number of trees used by wood carvers and the price paid per tree. As shown in Table 3.18, the majority of the respondents involved in wood products used four trees a month. The price at which they acquire trees differs from buyer to buyer. As shown in Table 3.19, the majority of respondents acquire their trees at price of GH¢ 30 per tree.

**Table 3.18: Number of Trees Purchased in a Month by Wood Carvers**

No. of trees	%age of respondents
1	12.5
2	18.8
3	6.2
4	50.0
5	12.5

Source: Survey

**Table 3.19: Price per Tree paid by Respondents**

Price per tree	%age of respondents
10	12.5
15	12.5
20	12.5
25	6.2
30	56.2

Source: Survey

Table 3.20 shows the total amount spent on plywood by furniture producers. From the table it can be observed that the majority of respondents spend between GH¢ 60 and GH¢ 200 a month on plywood.

**Table 3.20: Total Amount Spent on Plywood in a Month by Furniture Producers**

Amount Spent	%age
60-200	70
250-6000	30

Source: Survey

### 3.4.3 Issues with Marketing/Credit and Taxes

Respondents identified four main markets—local, regional, national and international markets—in which they sell their products. Within each market, they sell to different categories of people. For instance within the local market, they can sell directly to individuals, to agents, to associations and to NGOs. The statistics showed that all respondents have one way or the other sold in each market to different categories of people.

Respondents pay different categories of taxes and levies. These include income tax, market toll, district assembly taxes etc. The majority of respondents pay GH¢ 2 in a month in the form of District Assembly Levy while the majority also pay GH¢ 20 per month as income tax to the Internal Revenue Service.

The credit situation in the case of wood products producers is not significantly different from that of wood inputs suppliers. With the exception of the year 2009, where only three of the respondents applied for credit, none of the respondents had access to credit in 2007 and 2008. Only three institutions provide credit to respondents. None of the applicants got the exact amount requested for. In all GH¢ 2,500 was requested but only GH¢1,700 was granted.<sup>34</sup> None of the loans lasted for a year. Furthermore, in each case of loan acquisition, some facilitation fees were paid by applicants.

### 3.4.4 Challenges Confronting Wood Products Producers

Wood products producers identified a number of problems they faced in their business. These problems include:

- Unfair competition from foreign products
- Non-availability of raw materials (especially wood) and the expensive nature of wood
- Insufficient demand for products
- Non-availability of credit to expand business
- Long hours spent on making products (i.e. due to the lack of appropriate equipment)
- Low prices offered by buyers
- Non availability of a proper market to market their products
- Difficulty in payment when they sell their products on credit
- Bad roads linking them to source of raw materials

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<sup>34</sup> See Table A3.2 of Appendix for details.

### 3.4.5 Outlook for Wood Value Actors if there are Large Price Variations

In terms of outlook of their businesses in the near future, respondents' responses were not encouraging. Respondents were asked '*How would you change your production if you were sure that the average price would increase by 30%-50% in each of the two years?*' Responses given by respondents include:

- I cannot tell
- I will produce my current output
- I will change how much I produce now
- I will not change how much I produce now etc.

The majority of the respondents said they would not change their current production levels if they expected a price increase in future. The question one may ask is: *Why are wood products producers acting this way?* A number of reasons can be adduced to this behavior. One such reason is the lack of requisite skills on the part of producers to expand their businesses. Secondly, producers do not have the knowledge and capabilities to expand their businesses even when they expect increases in prices in the future.

## 3.5 Conclusions

This chapter basically looked at the major findings from a survey on wood carvers and furniture producers in the Ashanti Region. For the purposes of value chain analysis players/actors in the sector were placed into four main categories. The survey produced very interesting results and it is advocated that attention be paid to the sector so as to solve its problems.

This is a sector that employed more than 39,000 Ghanaians nationwide and more than 7,000 people in Ashanti Region (National Industrial Census 2003) hence efforts made to revamp the sector will go a long way to generate employment and improve livelihoods. Based on the findings of the survey, the following are recommended to policymakers:

- Make efforts to enhance credit availability to players in the wood sector. This will help the actors to expand their business so as to produce more and employ more people.
- Offer actors support services in the form of training, market information and advice. Make efforts to educate players on where to sell their products- i.e. provide actors with information on market availability.
- Make efforts to reduce the unnecessary harassment that wood product transporters experience when transporting wood to their various destinations.
- Encourage actors to form associations and unions (especially the wood products producers). This will help them to negotiate reasonable prices for their products and also to prevent exploitation by buyers.

## 4. Income and Employment Multipliers for The Upper East and Ashanti Regions

### 4.1 Introduction

The research team's approach to generating the economic multipliers followed the methodology outlined in the first chapter. The underlying reasoning was that the region's incomes come from producing baskets or wood products to sell to other areas and overseas. The income generated into the local economy by "exports" has a multiplier effect because some of it is re-spent locally. The level of re-spending is based on how much local businesses and consumers buy from local businesses.

From the input-output part of the 27-sector 2005 Social Accounting Matrix for Ghana, the Leontief coefficients were obtained for the wood sector which includes handcrafts and straw products. The key assumption underlying the SAM is the supposition of fixed-proportion production functions (constant returns to scale). The multipliers also make no allusion to profitability of the local industry or the resource constraints faced by the industry.

In terms of effects on local employment, it is possible that new jobs go to new residents, which leads to increased consumer spending on local products. Nevertheless where the new jobs go to current residents the increase in employment and incomes would be less than expected. The reverse could occur with declining jobs generating declining incomes. Otherwise it is possible for out-of-work active people to work elsewhere while still residing in the same locality.

### 4.2 Local Index of Purchases for the Upper East Region

For the Upper East Region, the Internal Index for purchases is 0.30. Thus GH¢ 30 of every GH¢ 100 of output from the straw products sector is spent within the Bolgatanga area for the purchase of intermediate goods, services and labor to be used in subsequent production. This index is what Bromley (1972) states can be an approximation to the Leontief coefficient. From the National Social Accounting Matrix, the Leontief coefficient for the wood sector is 0.1452 which includes handcrafts, furniture and other wood products.

### 4.3 Estimates of Income and Employment Multipliers for Upper East Region and Ashanti Region

Table 4.1: Estimated Income and Employment Multipliers

Indicator	Upper East Region - Estimate 1	Ashanti Region - Estimate
Index of internal purchases	0.30	0.86
Type I income multiplier -	1.199	0.064
Type II income multiplier -	1.925	0.086
Type I employment multiplier -	0.0155	0.053
Type II income multiplier	0.161	0.054
Regional Income Multiplier - M	1.584	2.15

Source: Data from Table A4 in the Annex.

This is expressed as the ratio of the direct plus the indirect income change to the direct income change resulting from a unit increase in final demand for any given sector. Table 4.1 summarizes the multipliers derived from the study.

Two multipliers of particular interest are the employment multipliers and the regional income multipliers. The Type II income multiplier  ${}_2m_j$  measures the ratio of the direct, indirect and induced income change to the direct income change resulting from a unit increase in final demand. The Type II multiplier takes into account the cumulative effects of secondary rounds of consumer spending in addition to the direct and indirect inter-industry effects. Thus, it gives the amount of income expansion due to successive rounds of consumer spending.

For the basket sector GH¢ 1,000 sales by a producer, creates 160 additional jobs (given Type II employment multiplier of 0.16) in the economy including those in the basket value chain. Secondly, given the Upper East regional multiplier's value of 1.58, for every GH¢ 1,000 of basket sales, additional household income of GH¢ 580 is created in the region. Hence new household incomes eventually amount to GH¢ 1,580. The GH¢ 1,000 of sales is the direct effect on income to the basket makers, plus the multiplier effect of an additional GH¢ 580. The low Type II employment multiplier for the basket sector reflect the fact that the basket makers are self-employed or in associations and take on very few hands. Most income accrues to the operators themselves as payments for labor input are small. The actors in the value chain who employ more hands are transporters, agents and shopkeepers selling various products in addition to inputs for the basket sector.

Similarly, for every GH¢ 1,000 sales of wood handcrafts in the Kumasi metropolis an additional 100 jobs are generated in the economy. Ashanti Region's income multiplier of 2.15 indicates that for every GH¢ 1,000 of sales, additional household income of GH¢ 1,150 is created in the region. Thus new household income is GH¢2,150.

Even though both sectors are related to the agricultural sector by way of the major raw material inputs, the basket sector has more leakages from the local economy than the wood handcraft sector. This is because most inputs come from outside the Upper East Region. This implies that more income from the basket sector is channeled back to the Bolgatanga economy benefitting the Upper East Region. The very low income multipliers for the wood handcraft sector results from the higher leakages through imported inputs (tools etc) and much higher payment for inputs elsewhere than in the basket sector.

## 5. Conclusions and Recommendations

### 5.1 Introduction

The Department of Economics was contracted to undertake this study which was part of a larger study in West Africa to develop a method of estimating the income and employment effects of export promotion by the USAID West Africa Trade Hub. The main focus of this study, as outlined in the terms of reference, was to estimate the internal indices of purchases, income and employment multipliers for the Ashanti and Upper East regions of Ghana using two tradable goods produced in those regions. These goods are baskets and related straw-based products produced in the Bolgatanga area of the Upper East Region and wood handicrafts and furniture from the Kumasi metropolis of the Ashanti Region.<sup>35</sup>

As part of the work, the research team conducted surveys in Bolgatanga on the basket sector and in Kumasi on the wood sector. Questionnaires were administered to 118 respondents in the Bolgatanga area and 116 in Kumasi. A pilot survey was conducted early in February with the aim of polishing up the questionnaires. It was completed for the wood sector on February 15 and for the basket study on February 22, 2010. The final questionnaires were ready by Feb. 25. The final survey was done in two phases in April and the first week of May 2010.

### 5.2 Findings and Recommendations for the Basket Sector in the Upper East Region

Women dominate the production of baskets and the other straw products. Basket production is conducted mainly during the dry season when there is reduced farming activity. Production is mainly centred on small groups or associations. The average sales of a basket producer were GH¢ 723.30 while the average cost of inputs (purchases) used for basket making were GH¢ 218.61 per year. The margins earned make it a viable industry but rising costs of major inputs such as straw and imported dyes are a threat. For the export market these considerations are important because of competition from Asian producers of similar products.

Given the endemic poverty in the Upper East Region and the threat from competitors, policy action to reduce the cost of production is vital.

The index of internal purchases for the baskets industry was 0.30. With regard to the multipliers, for the baskets sector the Type I income multiplier ( ${}_1m_j$ ) is 1.199 while the Type II income multiplier ( ${}_2m_j$ ) is 1.925. This provided evidence of the relative positive impact of basket production on the Upper East Region's economy. The rather lower employment multipliers were: Type I employment multiplier ( ${}_1e_j$ ) with value 0.0155 and the Type II income multiplier ( ${}_2e_j$ ) at 0.161. Finally the Upper East Region's regional economy multiplier (M) is 1.58.

The key point is to reduce production costs in order to remain competitive on the world market. Recommendations emerging from the study are as follows:

- Promote suitable year-round straw production around Bolgatanga by deploying water from the Vea irrigation canal which comes down to the nearby Nyariga area. Government—through the Bolgatanga Municipal Authority—could create a land bank for this purpose.

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<sup>35</sup> The Ashanti Region was third in terms of industrial output in Ghana while the Upper East Region was 10th or last.

- Establish an inland port at Tamale—this would shorten the distance for delivering goods to shippers. The port could also serve the needs of other sectors in northern Ghana.
- Convert Tamale airport into an international airport—this could also allow air freight of handcrafts and other goods to meet urgent purchase orders apart from boosting the export industry within a day’s journey of Tamale.<sup>36</sup>
- Contract a haulage company—this could be done by the Municipal authorities—to cart the baskets to the ports at specified periods in view of the potentially increased taxes possible from the sector.
- Promote new basket designs and patenting of traditional Bolga designs—this could be facilitated by the Ghana Export Promotion Centre or Ministry of Trade and Industries.
- Facilitate industrial type production by training more people in color combinations and dyeing. Expertise in industrial arts is available from locally from Bolgatanga Polytechnic or Kwame Nkrumah University of Science and Technology.
- Eliminate illegal fees paid at police and customs checkpoints which delay transporters and increase costs
- Provide a better market site with warehouses for basket sellers

### **5.3 Findings and Recommendations for the Wood Handcraft Sector in the Ashanti Region<sup>37</sup>**

This is a sector that employed more than 39,000 Ghanaians nationwide and more than 7,000 people in Ashanti Region (National Industrial Census 2003). Both genders are well represented in this sector.

The index of internal purchases was 0.86.

In terms of the other multipliers these showed that the wood handcraft industry has positive impacts on the Kumasi area in terms of income and employment. Type I and Type II income multipliers were 0.064 and 0.086 respectively. In addition, the Type I employment multiplier was about 0.05 while the Type II multiplier was about 0.10.<sup>38</sup> The Ashanti Region’s economy’s multiplier was estimated to be 2.15.

Overall the results show that the production and export of baskets and wood products from the Upper East and Ashanti Regions have a positive impact on the regional economies. However the issue of high production costs exacerbated by poor infrastructure and the collection of illegal fees could make the products less competitive in relation to competitors overseas.

Based on the findings of the survey, the following are recommended to policymakers:

- Make full efforts to enhance credit availability to players in the wood sector. This will help the actors to expand their business so as to produce more and employ more people.

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<sup>36</sup> A 50 mile radius of Tamale could have a viable export-based horticultural industry.

<sup>37</sup> Includes furniture.

<sup>38</sup> Figure rounded up to two decimal places.

- Offer support services in the form of training, market information, and advice to actors. Make efforts to educate players on where to sell their products—in other words, give actors information on market availability.
- Make efforts to reduce the unnecessary harassment wood product transporters encounter when transporting wood to their various destinations.
- Encourage actors to form associations and unions (especially wood-product producers). This will help them to negotiate reasonable prices for their products and also to prevent exploitation by buyers.

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**ANNEX****Table A1 - Annual Exports of Handcrafts (US\$ – Millions)**

	Handcraft Exports	All Nontraditional Exports	Share of handcrafts (%)
2008	3.3	1340.94	0.25
2007	3.796	1164.51	0.33
2006	4.490	892.88	0.50
2005	2.882	777.6	0.37
2004	5.202	705.4	0.74
2003	4.167	588.9	0.71
2002	11.310	504.3	2.24
2001	14.892	459.6	3.24
2000	4.977	400.7	1.24
1999	6.655	404.4	1.65
1998	6.387	401.7	1.59
1997	4.719	329.1	1.43
1996	2.922	276.2	1.06
1995	2.073	159.7	1.30
1994	2.327	119.3	1.95
1993	2.576	71.7	3.59
1992	1.471	68.4	2.15

Source: Ghana Export Promotion Council

**Table A2-Members of Ghamfin in Upper East Region**

1	<a href="#">Action Aid Ghana</a> - Financial NGO
2	<a href="#">Ghana Cooperative Susu Collections Associations</a> - Apex Body
3	<a href="#">Bessfa Rural Bank Ltd</a> - Rural Bank
4	<a href="#">Bewda Ghana</a> - Financial NGO
5	<a href="#">Centre for Sustainable Devt. Initiatives</a> - Financial NGO
6	<a href="#">Christian Mothers Association</a> - Financial NGO
7	<a href="#">Copama Agric Business Services Ltd</a> - Financial NGO
8	<a href="#">Credit Union Association</a> - Apex Body
9	<a href="#">Maata-N-Tudu Association</a> - Financial NGO
10	<a href="#">OAK Extension</a> - Financial NGO
11	<a href="#">Opportunity Industries Center Intl</a> - Financial NGO
12	<a href="#">PAB Development Consultants</a> - Business Development Service Provider
13	<a href="#">Program for Rural Integrated Devt</a> - Financial NGO
14	<a href="#">Rural Women Association</a> - Financial NGO
15	<a href="#">Gnado</a> - Financial NGO
16	<a href="#">ARB Apex Bank Ltd.</a> - Apex Body

**Table A 2.4 - Income of Producers (GH¢)**

	Sales	Purchases	Gross Margin
Mean	723.30	218.61	483.10
Standard Error	70.55	21.37	55.72
Median	528.00	167.50	386.00
Mode	180.00	190.00	215.00
Variance	353,365.19	32,410.41	220,407.22
Range	3265.00	878.20	3,146.00
Minimum	135.00	9.00	-160.00
Maximum	3400.00	887.20	2986.00
Sum	49,184.50	14,647.00	32,367.50
Sample Size	68.00	67.00	67.00

Source: Survey. Note: Some respondents adequately answered on incomes but not on costs and vice versa.

**Table A3-National Industrial Census data on Basket and Wood Handcrafts Sectors**

	Baskets/Straw Products Sector	Wood Carving and Furniture Sector
No. of enterprises with ≥ 10 employees	73	717
No. of enterprises with <10 employees	173	4,089
No. of persons engaged in enterprises with ≥ 10 employees	630	10,706
No. of persons engaged in enterprises with < 10 employees	521	18,919
Production volume (units or pieces)	19,066	383,899
Total Earnings (GH¢)	132,700	3,678,900

Source: National Industrial Census from Ghana Statistical Service

**Table A3.1: Proportion of Income from Hauling Of Wood Product as a %age of Total Income in the Past Month**

Total earnings from hauling wood products	Freq	Percent	Cum
250	2	9.52	9.52
300	5	23.81	33.33
400	3	14.29	47.62
500	4	19.05	66.67
600	4	19.05	85.71
800	1	4.76	90.48
1000	2	9.52	100
Total	21	100	

Source: Survey

**Table A3.2: Amount Requested, Amount Granted, Interest Charged and Loan Duration**

Amount requested	Amount granted	Interest rate Per annum	Period of loan
500	300	8	5 months
500	400	26	5 months
1,500	1,000	48	10 months

Source: Survey

**Table A4- Income and Employment Multipliers and other indicators**

Indicator	Upper East Region - Estimate 1	Ashanti Region -Estimate 1
G	0.310	0.25
Hoj	0.892	0.70
Hoi	0.108	0.30
Poj	0.903	0.74
Poi	0.097	0.26
Foi	0.517	0.11
Foj	0.483	0.89
θ	1.605	1.35
	1.199	0.064
	1.925	0.086
V	0.70	0.584
Leontief Coefficient	0.1452 <sup>39</sup> (obtained using SAM)	0.1452
B	1.0678	0.904
S	0.701	0.27
	0.0155	0.0527
	0.161	0.0537
M	1.584	2.15

Source: Calculated using survey results, 2005 Ghana SAM, GLSS Round 5 and Industrial Census

**Table A4.1 – Estimated Income and Employment Multipliers**

Indicator	Upper East Region - Estimate 1	Ashanti Region – Estimate
Index of internal purchases	0.299	0.86
Type I income multiplier -	1.199	0.064
Type II income multiplier -	1.925	0.086
Type I employment multiplier -	0.0155	0.0527
Type II income multiplier	0.161	0.0537
Regional Income Multiplier- M	1.584	2.15

Source: using data from Table A4 in Annex.

<sup>39</sup> Obtained using the 2005 SAM for Ghana.

**Table A5: Sample Characteristics for Straw Producers**

<b>Value Chain Actor</b>	<b>Number</b>
Producers	71
Suppliers	34
Transporters	8
Agents	5
Total	118

## Attachment A: Scope of Work

### Department of Economics, University of Ghana

#### Background:

The Multiplier Effect Study is an effort by USAID to assess the impact of the Trade Hub's export work on poverty alleviation to gain a better understanding of how increased exports by individuals and firms translates into economic benefits as well as systemic changes within the larger value chains of which they are a part. The goal of the study is to quantify the effects of trade and value chain transformation on the regional economy of West Africa. The research falls within the broader research agenda which is to develop a method of estimating the household income effects of export-promotion activities in specific West African countries, namely, Burkina-Faso, Côte d'Ivoire, Ghana and Mali.

#### Program Summary for the Ghana Study:

The overall research to be conducted in Ghana is to study the multiplier effects of export promotion activities in the following sectors:

- (a) The basket and allied handcraft sector in the Upper East Region of Ghana
- (b) The wood handcraft and furniture sectors in the Ashanti Region of Ghana
- (c) The cultivation, marketing and processing of cashew nut in the Brong Ahafo Region of Ghana.

For this research agenda, it is intended to adopt an approach that will involve:

- (i) Building sub-national economy input-output type models - based mainly on data from the Ghana Social Accounting Matrix (SAM), Industrial Census (IC), and Living Standard Measurement Surveys (LSMS)
- (ii) Developing regional multiplier models for estimating the effects of exports on household incomes in a rural economy.
- (iii) Using these models in conjunction with field research and the sub-national input-output models to determine the direct and indirect employment and income implications of increased exports for specified sectors in order to provide sector-specific estimates of employment and income multipliers.

The research in Ghana will be carried out by two teams. One team, from the University of Ghana's Department of Economics, will study the production, employment and income generation in the basket and wood handcraft and furniture sectors in specified regions in Ghana, while the second team from the Department of Agricultural Economics and Agribusiness will focus on production, employment and income generation in the cashew sector.

The research program will be technically directed by Professor Daniel W. Bromley, of the University of Wisconsin, United States, with the Trade Hub technical experts and coordinated by Kafui Djonou, Technical Coordinator for Export Business Development at the Trade Hub.

Specifically Professor Bromley will provide technical input and guidance throughout the study and shall approve all key technical documents before implementation and final revisions.

## **Program Summary for the Department of Economics, University of Ghana**

### **Objective**

The research objective is to determine the current and potential future contributions of the basket and wood handcraft and furniture sectors to employment and income generation in Ghana.

### **Activities**

The Department of Economics of the University of Ghana, will carry out studies on the production, employment and income generation in the basket, and wood handcraft and furniture sectors. The research program will be built around the two parallel activities namely: (1) the standard multipliers—both direct and indirect—of increased exports in the handcrafts and furniture sectors; and (2) the efficiency gains in the Ghana economy directly attributable to induced institutional change brought on by increased exports.

Specifically, the Department of Economics will carry out the followings tasks:

1. Conduct desk research with reference to the Living Standards Measurement Surveys (LSMS) and Social Accounting Matrix (SAM) and the Industrial Census (IC) to develop a sub-national economy input-output type model.
2. Develop a methodological approach and survey instrument including questionnaires for the study in relation to the handcraft sector.
3. Pre-test the survey instrument in the two selected regions in Ghana (Upper East and Ashanti Regions) for handcrafts (baskets and wood products).
4. Conduct research with the final approved survey instrument in the field using two research assistants from the Department of Economics.
5. 50 artisan households will be interviewed in the Ashanti Region of Ghana and 40 artisan households will be interviewed in the Upper East Region of Ghana. The interview will concern production and marketing of baskets, wood handcrafts and furniture. The interviews will cover people affiliated with production and marketing of baskets, wood handcrafts and furniture. A minimum of 180 questionnaires in total should be completed during field work.
6. Derive sector-specific estimates of direct and indirect employment and income multipliers arising from increased exports in the basket, wood handcrafts and furniture sectors.

### **Expected Results:**

A report on the sub-national input-output models, as well as regional multipliers for the Upper East and Ashanti Regions of Ghana. The report should include (1) the standard multipliers—both direct and indirect—of increased exports in the handcrafts sectors; and (2) the efficiency gains in the Ghana economy directly attributable to induced institutional change brought on by increased exports.

### **Expected Deliverables:**

- Methodological approach and survey instrument developed for handcrafts
- 180 completed questionnaires from handcrafts artisans and traders in the Ashanti and Upper East Regions of Ghana
- Regional multiplier model for estimating the effects of exports on household incomes in a rural economy for the handcrafts sector
- Report on the multiplier effect of increased exports in baskets, wood handcrafts and furniture sectors and the efficiency gains in the Ghana economy directly attributable to induced institutional change as a result of increased exports.

Technical and field work is to be completed by April 30 2010

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## **APPENDIX V: Income Generation in Cashew Sector in Ghana**

**SEPTEMBER 2010**

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## Acronyms and Abbreviations

AGOA	African Growth and Opportunity Act
GH¢	Ghana Cedis
GLSS	Ghana Living Standards Survey
Ha	hectare (= 100 x 100 m = 10,000 m <sup>2</sup> or 2.47 acres)
ISSER	Institute of Statistical Social and Economic Reform
MT	Metric tonne (= 1,000 kilograms)
SAM	Ghana Social Accounting Matrix
LSMS	Living Standard Measurement Surveys

## Executive Summary

This study was commissioned by USAID to assess the impact of the Trade Hub's work on export-promotion and get a better understanding of how increased exports by individual farmers/firms translate into systemic changes within the larger value chains of which they are a part. The goal of the study is to quantify the effects of trade and value chain transformation on the regional economy of West Africa. This research falls within a broader research agenda which is to develop a method of estimating the household-income effects of export-promotion activities in West Africa, specifically, Burkina-Faso, Côte d'Ivoire, Ghana and Mali.

The research objective for the Department of Agricultural Economics and Agribusiness, University of Ghana was to determine the current and potential future contributions of the cashew sector to employment and income generation in Ghana.

The data required for the study under consideration are both primary and secondary data. For the primary data, the team developed structured questionnaires, pre-tested and administered to individual cashew farmers, cashew transporters and cashew farmers associations at two separate times (before cashew harvest started in February 2010 – which represents the impact for 2009 cashew activities (first round), and after cashew harvest at the end of April 2010 (second round). For the first round of data collection (in February 2010) the research team interviewed 80 cashew farmers, 8 cashew transporters, 27 cashew associations; and for the second round (end of April 2010) the team interviewed 67 cashew farmers, 10 cashew transporters and 29 cashew farmers' associations. For the secondary data, the team used relevant data from the Ghana Living Standards Survey (GLSS) rounds 4 & 5, and the Ghana Social Accounting Matrix 2005.

The index of internal purchases measures the proportion of income from cashew production spent by households on inputs for further production of cashew. The data available shows that in 2009 on average each respondent spent GH¢ 2,253.87 on inputs, which is 291.2% of average cashew income (GH¢774.00). Thus, expenditure on intermediate inputs, services and labor for further cashew production exceeds the income from cashew production by 191.2 %, which is consistent with the GLSS 4 & 5 results. In 2010, which covers only the first three and half months of the year, the internal purchase index is only 70.6 % of the cashew income. Thus GH¢ 70.60 of every GH¢ 100.00 Ghana Cedi of output from cashew farming is spent for the purchase of intermediate goods, services and labor to be used in subsequent production. It is expected that further expenditures will be incurred during the rest of the year (without accompanied income) which will increase the index for 2010.

In 2009, the highest multiplier among the computed multipliers was the Regional Income Multiplier (2.43), indicating that cashew production and exports activities have great impact on incomes of individuals involved in these activities in the regional economy. This was followed by Type II Income Multipliers (2.25), and then Type I Income Multipliers (0.18), and then by Type II Employment Multiplier (0.12), followed by the Type I Employment Multipliers (0.11), showing the relative impacts of cashew production and export activities on each of these variables within the households.

Also, in 2010 the highest multiplier among the computed multipliers was the Regional Income Multiplier (2.48), indicating that cashew production and exports activities have great impact on incomes of individuals involved in these activities in the regional economy. This was followed by Type II Income Multipliers (0.40), and then Type I Income Multipliers (0.17), and then by Type II Employment Multiplier (0.11), followed by the Type I

Employment Multipliers (0.08), showing the relative impacts of cashew production and export activities on each of these variables within the households.

In general, cashew production and export activities aided by the West Africa Trade Hub are beneficial to the development and creation of employments and incomes, not only within households but also in the regional economy as a whole.

However, the cashew farmers, transporters and associations mentioned the following problems in the performance of their activities: fluctuating and relatively low prices for their produce, high fuel cost, high cost of inputs, exploitation by cashew buyers/exporters, unavailability of processing facilities (for both cashew nuts and apples), relatively bad roads from farms to tarred roads, as well as high incidence of bush fires, which have implications for the development of agricultural policy in Ghana in relation to cashew production.

Even though these multipliers are high, these could be higher if the processing of most of the output was done domestically. The same can be said for the processing of the cashew apples. As such, with the current support from the West Africa Trade Hub and the Cashew Development Project in terms of area expansion and improving planting material and yields, efforts are needed to initiate apple processing to further enhance the multiplier effects.<sup>40</sup>

The magnitude of economic benefit is tied to the level of the industry's production. In the case of cashew, production is in turn tied to the number of hectares under cultivation and the average yield of these hectares. The total hectares cultivated are the key variable to the total economic benefit that the industry generates. Current hectare expansion support by the Ghana Government and West Africa Trade Hub must continue.

The cashew sector (cashew nuts, cashew kernel, and cashew apple processing) must be profitable and not depend on subsidies for a positive economic benefit to accrue to household and regional economy. Thus, government support must be specific, time bound and transparent to remove identified constraints in the industry which prevents profitable production of the crop but not to perpetuate inefficiency in the sector.

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<sup>40</sup> The Cashew Development Project supports Government of Ghana's initiatives to accelerate the pace of agricultural growth through promoting the expansion in areas under cultivation and the production of raw cashew nuts and processed kernels in high potential areas, developing rural infrastructure, encouraging private sector initiative, facilitating access to agricultural technology in cashew production and processing, increasing access to rural finance, diversifying agricultural production thereby encouraging the domestic and export markets, and building human resources and institutional capacity at the grassroots.

## 1. Introduction

### 1.1 Background

Agriculture is the mainstay of the Ghanaian economy. The sector's importance is acknowledged by virtue of its immense contribution to several important economic variables. Agriculture employs about 60% of the country's active workforce on a formal and informal basis and accounts for about 36.5% of GDP per annum (ISSER, 2007). There is a positive linkage between Ghana's economic growth rate and the performance of the agricultural sector. Agriculture is also a major source of revenue and foreign exchange for the economy. Prior to 1992, agriculture served as the leading source of foreign exchange earnings in the country. Agriculture contributed a substantial share of about an average of 62% per annum of total export earnings during the 1970s and 1980s. Over the period of January to March 1996, nontraditional agricultural exports alone contributed US\$ 43,707,780.31 (52.46% increase over that of 1995) to the foreign exchange earnings of the country. The fact that foreign exchange earnings secure a country in terms of meeting its demands for foreign commodities and managing current account deficit and balance of payments, the importance of agricultural exports to the economy of Ghana cannot be overemphasized. Although agricultural exports contribute significantly to the foreign exchange base of the country, its performance has been declining. Many analysts attribute this decline to, amongst others, the falling performance of cocoa exports which happens to be the main agricultural export since the 1950s. For instance, research revealed a negative elasticity of cocoa exports with respect to cocoa base capacity (Fosu, 1992). Ghana cannot therefore afford to over-rely on only cocoa for foreign exchange without recourse to diversifying the export base. In view of this, raw cashew nuts amongst other agricultural commodities have been considered for promotion.

The annual exports of raw cashew nuts are projected to reach 47,000 MT in 2020, contributing approximately US\$ 23 million in foreign exchange earnings (Cashew Development Project, 2009). In Ghana, cashew is grown as a cash crop in the coastal belt (Central, Greater Accra, and Volta Regions), the transitional belt of Brong-Ahafo, and Guinea Savanna belt, parts of Northern, Upper West and East Regions. The ideal rainfall regime is between 750 - 1300mm. Cashew is a hard crop which grows well on marginal land. It is seen as an ideal crop for soil conservation and afforestation, especially in savanna areas. Cashew cultivation in Ghana is largely a smallholder activity with the majority of farmers having an average farm size of between 0.8 – 2.5 ha. In this respect, more than 60,000 small holder farmers are engaged in cashew cultivation in the country. In recent years the interest for cashew has grown, evidenced by the growth of demand for cashew nut seed for planting which has increased from about 1 MT in 1994 annually to about 10 MT in 2007 annually. As at 2006, the estimated area under cultivation was about 59,000 ha with annual production of about 16,000 MT of raw cashew nuts. The standard practice is to inter-crop cashew with crops such as maize, millet, sorghum, yam, cassava, soybean, groundnut or chillies until the canopy closes. New plantations generally come into bearing with about 100 kg/ha in the third year after planting, increasing to about 1,200kg/ha in the tenth year, for grafted trees. Seedling cashews on the other hand would normally come into bearing in the second to third year after planting. since 2003 The Cashew Development Project has ensured the availability of improved planting materials for establishment of new cashew farms. This intervention was to overcome the problem of farmers using planting materials from unselected trees/farms for planting which had resulted in a lot the farms established in the 1990s producing uneconomic yields. There is the potential to increase yields of cashew farms. Currently, the Cashew Development Project has implemented a comprehensive farm rehabilitation program through

canopy substitution of old unproductive tree canopies with high yielding scion materials, selective thinning, pruning, weed, pest and disease control (Cashew Development Project, 2009).

## **2. Scope of Work (Terms of Reference)**

### **2.1 Background**

The Multiplier Effect Study represents an effort by USAID to assess the impact of the Trade Hub's work on export-promotion and get a better understanding of how increased exports by individual farmers/firms translate into systemic changes within the larger value chains of which they are a part.

The goal of the study is to quantify the effects of trade and value chain transformation on the regional economy of West Africa. This study falls within a broader research agenda which is to develop a method of estimating the household-income effects of export-promotion activities in West Africa, specifically, Burkina-Faso, Côte d'Ivoire, Ghana and Mali.

### **2.2 Program Summary for the Ghana Study**

The research program in Ghana was intended to adopt an approach that would involve:

- (i) Building sub-regional economy input-output type models – based mainly on data from Ghana Social Accounting Matrix (SAM) and Living Standard Measurement Surveys (LSMS)
- (ii) Field research to determine the direct and indirect employment and income implications of increased exports for specified sectors in order to provide sector-specific estimates of employment and income multipliers.

### **2.3 Objective**

The research objective was to determine the current and potential future contributions of the cashew sector to employment and income generation in Ghana and the sub-region.

### **2.4 Activities**

The Ghana Sector Study would involve:

- (i) The derivation of quasi input-output models for Brong Ahafo Region
- (ii) Field research on the cashew sector.

Field research for the cashew sector was conducted in the Brong Ahafo Region, and in one district each in the Northern and Upper West Regions.

The research program was built around the two parallel activities namely:

- 1) the standard multipliers—both direct and indirect—of increased exports in the cashew sector; and
- 2) the efficiency gains in the Ghanaian economy directly attributable to induced institutional change brought on by increased exports.

Specifically, the Department of Agricultural Economics and Agribusiness carried out the followings tasks:

- (i) Conducted desk research with reference to the Living Standards Measurement Surveys (LSMS) and Social Accounting Matrix (SAM) to develop a sub-regional economy input-output type model;
- (ii) Developed a methodological approach and survey instrument including questionnaires for the study in relation to the cashew sector;
- (iii) Pre-tested the survey instrument on the cashew sector in the Brong Ahafo Region in Ghana; and
- (iv) Conducted research on the cashew sector with the final approved survey instrument in the field using two research assistants from the Department of Agricultural Economics and Agribusiness.

The original plan was to do the following:

- (a) Interview 50 households of cashew farmers in Mim/Sampa and its environs in the Brong Ahafo Region. This interview was done twice (at the beginning and at the end of the cashew harvest). The interview covered production and marketing of raw cashew nuts.
- (b) Interview 30 marketers (including traders/exporters and local buying agents) of cashew nuts if available on marketing issues for raw cashew nuts. Transport firms were also to be interviewed.
- (c) Interview 5 processors (in Yummy, Winka, Mim, Ghana Nuts, SPB), of cashew nuts on economic impacts (personal, social and geographical) of the sector on various categories of persons. The interviews were cover all the people in and around or affiliated with processing units and with all levels of cashew processing, cultivation, marketing. i.e. a minimum of 20 interviews per processing unit, counting up to 100 interviews in total.<sup>41</sup>
- (d) Produce a regional multiplier model for the Brong Ahafo Region and analyses from the Living Standards Survey.

## 2.5 Expected Results

Produce a report on a regional multiplier model and effect of the cashew industry derived from the research in the Brong Ahafo Region. The report should include

- 1) the standard multipliers—both direct and indirect—of increased exports in the cashew sector; and
- 2) the efficiency gains in the Ghanaian economy directly attributable to induced institutional change brought on by increased exports.

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<sup>41</sup> Professor Bromley handled the data collection and analysis on processors.

### 3. Methodology

#### 3.1 Methods of Analysis

The multiplier effect study has to do with the concept of economic linkages and benefits. Increased exports of cashew will result in direct and indirect impacts.

Direct impacts are observed at the sector level, and these can be measured as the sector's change in output and value added caused by the increased exports.

The indirect impacts are, however, realised through production and consumption linkages. Production linkages can in turn be differentiated into Backward (purchases) and Forward linkages (transport and sales). Backward linkages represent the demand for additional input used by producers in order to supply additional products or services. Thus, the more input intensive the production technology is, the stronger its backward linkages. *Forward linkages* represent increase in supply to downstream industries. Thus, as production and marketing potentials exist in downstream industries (e.g. cashew processing), forward linkages contribute to output growth in these sectors. Consumption linkages results from the fact that the increased exports generate income to factor-earning institutions such as households and firms. Further, the increase in household spending generates additional demand for consumption goods and services and constitutes the consumption linkages. The total size of consumption linkages depends on several factors such as the share of factor income distributed to households, the composition of the consumption basket and the share of domestically supplied goods and services in household demand.<sup>42</sup>

The multiplier effects of the production and consumption linkages described above are “first round”, effects. These “first round” production and consumption effects induce fresh additional demand for goods and services. If this additional demand is met by domestic producers, this increase in production will generate fresh demand for intermediate and additional returns to factors. The factor incomes are then distributed to households. These are the “second round” effects. The “second round” effects will again increase demand and lead to “third-round” effects. This process goes on for several rounds. However, the “round-by round” effects become smaller from round to round and eventually cease. The multipliers add up all these multi-round effects and generate a higher impact than the direct effect alone.

This study made use of Regional input-output models to assess the impacts of cashew production activities on individual households in the region and beyond. The size of multipliers depends upon the structure of the economy. Thus, to calculate the multipliers, the research team needed relevant information on the structure of the economy of interest – in this case, the Brong Ahafo regional economy. To obtain information on the structure of the regional economy, the team needed to construct quasi regional input-output type models. Once the regional input-output model was built with all the relevant accounts in a consistent framework, it provided the basis for multiplier analysis.

Three types of multiplier model were employed in this study:

- a) Indices of internal sales and purchases, as described in Bromley (1972)
- b) Income and employment multipliers as described in Pagoulatos et al (1986) and
- c) Regional income multiplier as described in Bromley (2009)

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<sup>42</sup> Factor income denotes repayments and dividends from loans and investments.

**a) Estimation of the Indices of Internal Sales and Purchases**

The index of internal purchases is defined as:

$$u_j = \sum_1^n a_{ij} \quad (1)$$

where  $a_{ij}$ 's are the technical coefficients from an input-output matrix with  $n$  endogenous sectors. Each coefficient is the proportion of each Ghana cedi of output from sector  $j$  spent within the economy for intermediate goods, services and labor to be used in further production.

The index of internal sales is measured as in equation (2) below:

$$w_i = \sum_1^n a_{ij} X_j / X_i \quad (2)$$

Where  $w_i$  denotes the index of internal sales, and  $X_i$  denotes total output of the  $i^{\text{th}}$  sector. The ratio in equation (2) indicates what proportion of total output of the  $i^{\text{th}}$  sector ( $X_i$ ) was sold to be used in further production and to be consumed in the economy under study. Further, the index of internal sales measures the extent to which a sector's output is used in further production of goods and services within the economy relative to the proportion exported or designated for capital formation.

Indices of internal sales and purchases shed light on which activities are prime movers for sector interdependence. For instance, the sectors with high internal sales and purchases include those that are highly interrelated with the rest of the economy and have high income and employment effects because of significant indirect effects, whereas the sector with low purchases and low sales are those which import much of their input requirements and likewise export much of their output. The cashew sector is a sector with high purchases of intermediate goods, services and labor and low levels of domestic sales. This sector exports much of its output but purchases most of its inputs domestically.

**b) Estimation of Sub-national Level Income and Employment Multipliers**

Following from the seminal work of Pagoulatos et al, (1986), when an input-output table is available for instance, at the national level, reliable sub-national level income and employment multipliers can be obtained. Sectoral output, income, employment, and household consumption information at the sub-regional level increases the accuracy of the estimation.

Following their analysis, Let  $A^c$  be a  $[(m-v) \times (n-v)]$  matrix, where  $v$  is the number of sectors of the  $(m=n)$  national level endogenous sectors which do not exist at the sub-national level. Let  $B$  be the Leontief inverse matrix  $(1 - A^c)^{-1}$  with elements  $b^{ij}$ . These elements represent the direct and indirect effects on output of the  $i^{\text{th}}$  sector from a change in the final demand of sector  $j$ .

Also:

Let  $H$  be the  $1 \times (n-v)$  row vector whose elements,  $h_{oj}$  are the ratios of the sub-national household services purchased by the  $j^{\text{th}}$  sector to the total  $j^{\text{th}}$  sector input

Let  $F$  be the  $(n-v) \times 1$  column vector whose elements  $f_{io}$  are the sub-national consumption coefficients of the household

Let  $g$  be the country intra-household consumption coefficient

Let  $p_{oj}$  be the county-level direct employment coefficients per Ghana cedi of output of the  $j^{th}$  sector.

Following from Pagoulatos et al, (1986), **the direct and indirect income multipliers (type I multipliers)**,  ${}_1m_j$ , are obtained as the ratio of the direct plus indirect income effects to the direct income effect:

$${}_1m_j = \frac{\sum_{i=1}^{n-v} h_{oi} b_{ij}}{h_{oj}} \quad (3)$$

**The Type II income multipliers (direct, indirect and induced effects)** can be obtained as a multiple of a constant term  $\theta$  of the type I income multiplier:

$${}_2m_j = {}_1m_j \theta \quad (4)$$

where  $\theta$  is a scalar and given by:

$$\theta = [1 - (g + HBF)]^{-1} \quad (5)$$

**The direct employment multipliers** can be obtained as the ratio of employment and output for each sector. The type I employment multipliers  ${}_1e_i$  is given by

$${}_1e_i = \frac{\sum_{i=1}^{n-v} p_{oi} b_{ij}}{p_{oj}} \quad (6)$$

The Type II employment multiplier ( ${}_2e_i$ ) is given by:

$${}_2e_i = \frac{(\sum_{i=1}^{n-v} p_{oi} b_{ij} + PBF [1 - (g + HBF)]^{-1} \sum_{i=1}^{n-v} h_{oi} b_{ij})}{p_{oj}} \quad (7)$$

### c) The Regional Income Multiplier Model

Bromley (2009) developed a simple regional income multiplier model for estimating the household income effects of export promotion activities in a rural economy. Under a set of simplifying assumptions, the multiplier showing the effects on regional income from an increase in the production of tradables in the regional economy is then derived as:

(8)

where: 
$$M = \frac{1}{1 - a_n - \beta_n v (1 - s)}$$

$a_n$  = the Leontief Coefficient for intermediate demand;

$\beta_n$  = the marginal (incremental) share of total expenditure on non-tradable;

$v$  = the share of gross output in the regional economy that goes to household income;

$s$  = leakage from the regional economy in the form of taxes and savings

The methods of analysis described in this section formed the basis for the quantitative analysis in this study.

## **3.2 Data**

Both primary and secondary data were required for the study. For the primary data, the research team developed structured questionnaires, pre-tested and administered to individual cashew farmers, cashew transporters and cashew farmers' associations at two separate times (before cashew harvest started in February 2010 – which represents the impact for 2009 cashew activities (first round), and after cashew harvest at the end of April 2010 (second round)). This enabled the team to assess the impact of cashew activities before and after harvest. The team sampled cashew farmers and cashew transporters in the Brong-Ahafo Region (Jaman North, Jaman South, Drobo, Techiman, Wenchi, Nkoranza, Kitampo North, and Kitampo South Districts); the Northern Region (Bole District) and Ga in the Upper West Region. Further, the team interviewed all existing and functioning cashew farmers' associations in the Brong-Ahafo Region. Mindful of bias, the team ensured that it interviewed the same respondents on both data collection occasions, even though there were a few absentees during the second round of data collection. For the first round of data collection (February 2010) the team interviewed 80 cashew farmers, 8 cashew transporters, 27 cashew associations; and for the second round (end of April 2010) the team interviewed 67 cashew farmers, 10 cashew transporters, 29 cashew associations.

For the secondary data, the team used relevant information from GLSS 4 & 5, and Ghana Social Accounting Matrix 2005.

## **3.3 Description of the Brong Ahafo Region**

### **3.3.1 Physical Features**

Brong Ahafo, with a land size of 39,557 square kilometers (km), is the second largest region in the country (16.6%). The region shares boundaries with the Northern Region to the north, the Volta and Eastern Regions to the south-east, Ashanti and Western Regions to the south, and Côte d'Ivoire to the west. The central point of Ghana's landmass is in this region, at Kintampo.

The region has a tropical climate, with high temperatures averaging 23.9°C (75°F) and a double maxima rainfall pattern. Rainfall ranges, from an average of 1000 millimeters (mm) in the northern parts to 1400 mm in the southern parts. The region has two main vegetation types, the moist semi-deciduous forest, mostly in the southern and southeastern parts, and the guinea savannah woodland, predominant in the northern and northeastern parts of the region. The level of development and variations in economic activity are largely due to these two vegetation types.

The moist semi-deciduous forest zone is conducive to the production of cash crops, such as cocoa and cashew. Brong Ahafo is one of the three largest cocoa-producing areas in the country, mainly in the Ahafo area, which shares a common border with western Ashanti. A lot of Ghana's cashew is produced in Brong Ahafo, some of which are processed into brandy and cashew wine at Nsawkaw in Wenchi. Timber is also an important forest product,

produced mainly in the Ahafo area around Mim, Goaso and Acherensua. Other cash crops grown in the forest area are coffee, rubber and tobacco. The main food crops are maize, cassava, plantain, yam, cocoyam, rice and tomatoes. Yam production is very high in the Guinea savannah zone, around Techiman, Kintampo, Nkoranza, Yeji, Prang and Kwame Danso.

### 3.3.2 Population Size, Growth Rates and Density

The region's population is 1,815,408, accounting for 9.6% of the country's total population. The region's population density of 45.9 persons per square kilometre (sq. km) in 2000 is lower than the national figure (79.3 persons/sq. km) and higher than those for only Northern (25.9 persons/ sq. km) and Upper West (31.2 persons/sq. km), which is similar to the situation in 1970 and 1984. There is therefore not much pressure on land, even though there has been a gradual increase in population density over the years, from 15 sq. km (1960), 19 sq. km (1970) and 31 sq. km (1984) to 45.9 sq. km in 2000.

### 3.3.3 Age and Sex Structure

The age structure of the country's population indicates a broad base that gradually tapers off with increasing age. This national picture is reflected at both the regional and district levels. A large proportion (43.1%) of the region's population is under 15 years, with a small proportion (4.5%) older than 64 years. The proportion for the under 15 years for the region is higher than that for the total country (41.3%) but shows a 3.4% decline from the corresponding 1984 figure. The reverse is the case for the elderly populations, with the proportion lower than the total country's (5.3%) but greater than the 1984 figure by 0.8%. The region has only slightly more males than females, with a sex ratio (males to 100 females) of 100.8. Indeed, the Region and the Northern Region are the only two regions at the national level with an almost equal proportion of males and females. Eight of the districts have sex ratios of more than 100. There are however more females than males for children under 5 years, than in the reproductive ages between 20 and 39 years, and the elderly (over 70 years). The age group 25-29 years has the lowest sex ratio of 90.0 while the age group 45-49 years has the highest of 121.

Techiman is a major market centre and a nodal town or entrepôt, where roads from the three northern regions converge.<sup>43</sup> Trunk roads from Sunyani, Kumasi, Wa and Tamale all meet at Techiman, thus making it a bustling food crop market and commercial centre.

## 4. Results

### 4.1 Demographic Characteristics of Respondents (Farmers, Transporters and Associations)

Table 1 shows the characteristics of the sampled households of cashew farmers. Persons per household were highest (six) in the Jaman South and North Districts, whilst the average persons per household in each of the remaining districts, as well as the average in all the districts is five. The average proportion of females older than 18 years is 0.45, whilst that of

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<sup>43</sup> An entrepôt is a place where goods are stored or deposited and from which they are distributed; a trading or market center.

males is 0.55. However it was observed that the proportion of females older than 18 years in the Jaman South and North together is 0.53 and that of males is 0.47. The average age of household heads (57 years) indicates that farming activities in the study area is mostly left to the care of the aged in the community; especially in Wenchi, Techiman and Nkoranza where the average age of the farmer (farm household head) is 59 years. The average quantity of land cultivated to cashew per household from the survey in 2009 and 2010 are 6.8 and 7.2 hectares respectively.<sup>44</sup> The cultivated area by cashew farmers in 2010 indicates that more farmers with larger farms were covered in the second round than in the first (2009). Most of the larger farms encountered were in the Jaman District raising the average household cultivated farm by an additional 0.8 hectares of cashew in 2010.

The average annual expenditures per household for all respondents in 2009 and 2010 were GH¢ 5,553.00 and GH¢ 1,526.00 respectively. In 2009, the expenditures in Wenchi, Techiman and Nkoranza Districts, and Jaman North and South Districts were higher than the average expenditures across all the districts (see Table 1).

**Table 1: Sample Household Characteristics of Cashew Farmers**

Characteristics	Average values of items	Wenchi, Techiman and Nkoranza	Jaman South and North	Kintampo South and North
Persons per household	5	5	6	5
Share of females > 18yrs	0.45	0.42	0.53	0.49
Share of males > 18yrs	0.55	0.58	0.47	0.51
Avg. age of Household head	57	59	56	56
Land of cashew cultivated (2009) in hectares	6.8	13.2	4.8	2.4
Land of cashew cultivated (2010) in hectares	7.2	13.2	5.6	2.4
Annual Expenditure per household (2009)	5553	5986	6690	2994
Annual Expenditure per household (2010)	1526	1615	1520	1328

Note: \*\*All incomes and expenditures in the document are in Ghana Cedis (GH¢). Figures for 2010 are for the first three and half months only.

Table 2 shows that the average cashew income of all households surveyed increased from GH¢ 774.00 in 2009 to GH¢ 1,772.00 in 2010. The average income from other crops decreased from GH¢ 2,721.00 in 2009 to GH¢ 1,063.00 in 2010. The average non-crop incomes per household for 2009 and 2010 in were GH¢ 2,421.00 and GH¢ 812.00 respectively. Furthermore it can be estimated that the average annual income from non-crop income in 2009 is about 30% of the average annual expenditure on all goods and services consumed by the farm households in the same year. However in 2010, the estimated average non-crop income is about 53% of the average expenditure in the same year (see Table 1 and Table 2).

<sup>44</sup> A hectare is equal to 2.47 acres.

**Table 2: Cashew and other Agricultural and non-Agricultural Income**

Income Type	Weighted Average	Wenchi, Techiman and Nkoranza	Jaman	Kintampo	Bole and Ga
Cashew income in 2009	774	1,508	347	226	525.4
Other crop income in 2009	1,722	3,684	721	369	14,721.56
Non-crop income per household (2009)	2721	5,737	1864	835	389
<b>Average income per household in 2009</b>	<b>5,217</b>	<b>10,982</b>	<b>2,932</b>	<b>1,430</b>	<b>15,636</b>
Cashew income in 2010	1,063	3,046	710	408	-
Other crop income in 2010	2,421	6,143	2826	374	-
Non-crop income per household (2010)	812	1,615	637	571	-
<b>Average income per household in 2010</b>	<b>4,296</b>	<b>10,804</b>	<b>4,173</b>	<b>1,353</b>	<b>-</b>

Tables 3 and 4 present the average expenses by cashew transporters in 2009 and 2010 respectively. In 2009, the average annual expenditure by cashew transporters in the overall sample was GH¢ 17,751.50 as compared to GH¢ 15,061.00 for 2010. The major single expenditures were on fuel and tires which are all imported goods. The expenditure values for 2010 are lower because it covers only the first third of the year. However, the expenditure structure is identical for both 2009 and 2010.

**Table 3: Expenditure of Cashew Transporters for 2009**

Characteristics	Average		Wenchi		Kintampo North	
	Value	%	Value	%	Value	%
Truck(s) purchase price*	855.0	4.8	1460.0	6.1	250.0	2.2
Insurance	74	0.4	68	0.3	80	0.7
Roadworthy certificate	53	0.3	91	0.4	15	0.1
Fuel	8,089.5	45.6	13,865	58.1	2314	20.2
Engine oil	813.5	4.6	836	3.5	791	6.9
Equipment maintenance	1,705.0	9.6	2,480.0	10.4	930.0	8.1
Hire labor	1,679.5	9.5	2219	9.3	1140	10.0
Tires	2,859.5	16.1	619	2.6	5,100	44.6
Tarpaulin	350	2.0	350	1.5	350	3.1
Packing tolls	86	0.5	148	0.6	24	0.2

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Characteristics	Average		Wenchi		Kintampo North	
	Value	%	Value	%	Value	%
Taxes	467	2.6	802	3.4	132	1.2
Expediter	208	1.2	208	0.9	0	0.0
Loading and unloading	91.5	0.5	153	0.6	30	0.3
Others	420	2.4	552	2.3	288	2.5
<b>Total expenditure</b>	<b>17,751.5</b>	<b>100</b>	<b>23851</b>	<b>100</b>	<b>11444</b>	<b>100</b>

\*Purchase price of the vehicle is GH¢14,600 for Wenchi operator and GH¢2,500 for the Kintampo North operator. With an economic life of 10 years, annual average depreciation is estimated as GH¢855.00.

**Table 4: Expenditure of Cashew Transporters for 2010**

Characteristics	Average		Wenchi		Jaman South		Kintampo North	
	Value	%	Value	%	Value	%	Value	%
Truck(s) purchase price*	1,500	10.0	-	-	15,00	25.1	-	-
Insurance	60	0.4	60	0.4	-	-	-	-
Roadworthy certificate	30	0.2	193	1.2	-	-	30	0.5
Fuel	2,890	19.2	4,570	28.8	500	8.4	3,600	55.8
Engine oil	240	1.6	273	1.7	-	-	240	3.7
Equipment maintenance	745	4.9	1,035	6.5	100	1.7	1,100	17.0
Hire labor	1,249	8.3	386	2.4	3000	50.3	360	5.6
Tires	1,390	9.2	2,300	14.5	480	8.0	-	-
Packing tolls	64	0.4	69	0.4	4	0.1	120	1.9
Taxes	54	0.4	50	0.3	6	0.1	105	1.6
Expediter	140	0.9	140	0.9	-	-	-	-
Loading and unloading	699	4.6	816	5.1	380	6.4	900	13.9
Others	6,000	39.8	6,000	37.8	-	-	-	-
<b>Total expenditure</b>	<b>15,061</b>	<b>100.0</b>	<b>15,892</b>	<b>100.0</b>	<b>5970</b>	<b>100.0</b>	<b>6455</b>	<b>100.0</b>

\*Purchase price of the vehicle is GH¢15,000 for Jaman South operator. With an economic life of 10 year, annual depreciation is GH¢1,500.

Table 5 shows that cashew transporters in Kintampo North District have a greater share (70%) of the income from the cashew transport business in 2009 as compared to transporters in Wenchi District where incomes from cashew transportation make up only 13% of the entire income from transport business. However, results presented in Table 6 reveal that although the monetary value of income generated from transporting cashew in 2010 is lower,

the percentage share of this income as total income from the transport business increased from 27% in 2009 to 44%. Surprisingly, in Kintampo North District the cashew transport income was on average only GH¢ 150.00, accounting for only 2% of the overall transport business. This could be attributed to the fact that most of the producers and associations directly involved in marketing cashews were holding their cashew in anticipation of increasing future prices. However, in Jaman South District the percentage share of the income earned from cashew transport was the same as that from the entire transport business.

**Table 5: Average Annual Income by Cashew Transporters 2009**

Characteristics	Total		Wenchi		Kintampo North	
	Avg. (GH¢)	%	Avg. (GH¢)	%	Avg. (GH¢)	%
Cashew transport per annum	4527	27	3228	13	5826	70
Overall transport business per annum	17044	-	25717	-	8370	-

**Table 6: Average Annual Income by Cashew Transporters 2010**

Characteristics	Total		Wenchi		Jaman South		Kintampo North	
	Avg. (GH¢)	%	Avg. (GH¢)	%	Avg. (GH¢)	%	Avg. (GH¢)	%
Cashew transport per annum	3153	44	7884	69	1425	100	150	2
Overall transport business per annum	7094	-	11458	-	1425	-	8400	-

The overall sample reveal that the average expenses by the cashew associations is GH¢1,133 in 2009 (Table 7) as compared to GH¢ 2,584 in 2010 (Table 8), an increase of about 128%. However, with the exception of Wenchi, Techiman and Nkoranza Districts together experienced a decline in the expenses (91%) made in 2010. Jaman South and North, and Kintampo South and North Districts observed an increase of 322% and 13% respectively. On average labor cost was observed to be the dominant cost item in the expenditure of the associations in both 2009 and 2010. Labor cost was 46.8% in 2009 and 81.7% in 2010. Almost all expenditures, except elements of phone bills, transport and electricity, are domestic non-tradable expenses.

**Table 7: Average Expenditures of Cashew Associations for 2009**

Expenditure Items	Average expenditures		Wenchi, Techiman and Nkoranza		Jaman South and North		Kintampo South and North	
	Value	%	Value	%	Value	%	Value	%
Labor	530	46.8	225	20.1	1286	84.6	78	11.7
Rent	160	14.1	265	23.6	155	10.2	60	9.0
Phone bills	25	2.2	25	2.2	-	-	-	-
Electricity	22	1.9	20	1.8	24	1.6	-	-
Social	36	3.2	47	4.2	21	1.4	40	6.0
Registration	66	5.8	132	11.8	3.5	0.2	63	9.5
Transportation	86	7.6	199	17.8	30	2.0	28	4.2
Demand notices	128	11.3	128	11.4	-	-	396	59.5
Hospitality services	80	7.1	80	7.1	-	-	-	-
<b>Total expenditure</b>	<b>1133</b>	<b>100.0</b>	<b>1121</b>	<b>100.0</b>	<b>1519.5</b>	<b>100.0</b>	<b>665</b>	<b>100.0</b>

**Table 8: Average Expenditures of Cashew Associations for 2010**

Expenditure Items	Average expenditures		Wenchi, Techiman and Nkoranza		Jaman South and North		Kintampo South and North	
	Value	%	Value	%	Value	%	Value	%
Labor	2112	81.7	127	21.6	5986	93.3	224	29.9
Rent	169	6.5	98	16.7	230	3.6	180	24.0
Phone bills	12	0.5	35	6.0	-	-	-	-
Electricity	39	1.5	57	9.7	60	0.9	-	-
Social	32	1.2	20	3.4	70	1.1	5	0.7
Registration	13	0.5	-	-	-	-	40	5.3
Transportation	125	4.8	50	8.5	70	1.1	256	34.1
Demand notices	82	3.2	200	34.1	-	-	45	6.0
<b>Total expenditure</b>	<b>2584</b>	<b>100.0</b>	<b>587</b>	<b>100.0</b>	<b>6416</b>	<b>100.0</b>	<b>750</b>	<b>100.0</b>

Tables 9 and 10 show the purchases of the cashew association from members and non-members. In 2009, the combined purchases of the associations were 1,501.90 MT at a value of GH¢ 637,400.71. In that year, Techiman Cashew Farmers and Marketing Society made the highest purchases at a value of GH¢ 315,210.00. This was followed by Namesa Cashew Farmers' Association with cashew purchases valued at GH¢ 177,600.00, and the least purchases being made by Nkoransah Cashew Farmers' Association, with a value of GH¢ 2,000.00. The following associations did not make any purchases in 2009: Paninamisa Cashew Farmers' Association; Wenchi Cooperative Farmers' Association; Adansu Cooperative Cashew Farmers; Jema Kroye Cashew Farmers' Society; Tanoboase Cashew Farmers' Association; Asoo Mensah Cashew Farmers' Society; Japekrom Biakoye Cashew Farmers; Jirapa Cashew Union; and Yendi Cashew Farmers' Union.

In 2010, the combined purchases of the associations were 946.30 MT at a value of GH¢ 543,119.74. In this year, Nafana Cashew Growers Society made the highest purchases at a value of GH¢ 260,000.00. This was followed by Jaman South Cashew Farmers' Union with cashew purchases valued at GH¢ 112,000.00, and the least purchases being made by Asantekwaa Cashew Farmers' Society, with a value of GH¢ 624.00. Again, the following associations did not make any purchases in 2009: Wenchi Cooperative Farmers' Association; Techiman Cashew Farmers' & Marketing Association; Nkoransah Cashew Farmers' Association; and Asoo Mensah Cashew Farmers Society.

**Table 9: Purchases of the Cashew Associations in 2009**

Name of Association	Average Price	Total Purchases	Total Value of Purchases
Kintampo Municipal Cooperative	36.00	525.00	18,900.00
Dwenem Cashew Farmers' Cooperative	36.00	66.50	2,394.00
Paninamisa Cashew Farmers' Association	-	-	-
Asante kwaa Cashew Farmers' and Marketing Society	32.00	187.50	6,000.00
Tuobodom Municipal Cashew Farmers Society	32.00	962.50	30,800.00
Nafana Cashew Growers Society	32.00	5,550.00	177,600.00
Wurompo Cashew Farming And Marketing Society	36.00	165.00	5,940.00
Adansu Cooperative Cashew Farmers	-	-	-
Subinso Cashew Cooperative	36.00	123.00	4,428.00
Techiman Cashew Farmers' And Marketing Society	38.00	8,295.00	315,210.00

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Name of Association	Average Price	Total Purchases	Total Value of Purchases
Wenchi Cooperative Farmers' Association	-	-	-
Kintampo Municipal Cashew Society	32.00	105.00	3,360.00
Badukrom Cooperative Cashew Farmers And Marketers Society	32.00	70.00	2,240.00
Jema Kroye Cashew Farmers' Society	-	-	-
Yesu Adom Cooperative Cashew Farmers' Association	36.00	150.00	5,400.00
Nkoransah Cashew Farmers' Association	32.00	62.50	2,000.00
Tanoboase Cashew Farmers' Association	-	-	-
Nyame Adom Cashew Farmers' Association	32.00	740.60	23,699.20
Nchiraman Cashew Farmers' Association	36.00	285.00	10,260.00
Asoo Mensah Cashew Farmers' Society	-	-	-
Japekrom Biakoye Cashew Farmers	-	-	-
Atimkorase Kenten Cashew Production And Marketing Society	32.00	340.65	10,900.80
Jaman South Cashew Farmers' Union	36.00	87.50	3,150.00
Namesa Cashew Farmers' Association	40.00	960.00	38,400.00
Jirapa Cashew Union	-	-	-
Yendi Cashew Farmers' Union	-	-	-
<b>Total Bags/Value of Purchases</b>		<b>18,773.75</b>	<b>637,400.71</b>
<b>Metric tonnes/Value of Purchases</b>		<b>1,501.90</b>	<b>637,400.71</b>

**Table 10: Purchases of the Cashew Associations in 2010**

Name of Association	Average Price	Total Purchases	Total Value of Purchases
Wurompo Cashew Farming & Mkt. Association	52	300.00	15,600.00
Subinso Cashew Cooperative	48	93.00	4,464.00
Wenchi Cooperative Farmers Association	-	-	-
Wenchi Farmers & Mkt. Association	48	292.00	14,016.00
Nchiraa Farmers & Mkt. Association	48	248.65	11,935.20
Tuobodom Municipal Cashew Farmers' Association	48	532.15	25,543.26
Tuobodom Cashew Farmers' Association	-	-	-
Techiman Cashew Farmers' & Mkt. Association	-	-	-
Nyame Adom Cashew Farmers' Association	48	762.73	36610.80
Atinkorase Kenten Cashew Production & Mkt. Society	44	290.05	12,762.20
Nkoranza Cashew Farmers' Association	-	-	-
Adamsu Cashew Farmers' Cooperative	56	141.31	7,913.50
Asoo Mensah Cashew Farmers' Society	-	-	-
Jaman South Cashew Farmers' Union	56	2,000.00	112,000.00
Dwenem Cashew Farmers' Society	48	210.00	10,080.00
Nafana Cashew Growers Society	40	6,500.00	260,000.00
Jema Kroye Cashew Farmers' Association	46.4	209.31	9,712.10
Yesua Adom Cashew Farmers' Association	46.1	82.54	3,806.74
Peninamisa Cashew Farmers' Association	46.4	86.79	4,026.94
Kintampo Municipal Cashew Farmers' & Mkt. Union	48	212.50	10,200.00
Badukrom Cashew Farmers' & Mkt. Society	48	79.69	3,825.00
Asantekwaa Cashew Farmers' Society	48	13.00	624.00
<b>Total bags/Total Value of Purchases</b>		<b>12,053.72</b>	<b>543,119.74</b>
<b>Metric tonnes/Value of Purchases</b>		<b>964.30</b>	<b>543,119.74</b>

Note: A bag of cashew nut weighs 80 kg.

## 4.2 Indices of Internal Sales and Purchases

The index of internal sales indicates the proportion of income from sales of cashew produced for further production (processing) in the domestic market. In the case of cashew limited domestic processing takes place. Therefore, the index is approximated to zero. The index of internal purchases given by equation (1) in the previous section measures the proportion of income from cashew production that is spent by household on inputs for further production of cashew nuts. The data available and presented in Table 11 show that in 2009 on average each respondent spent GH¢ 2,253.87 on inputs, which is 291.2 % of average cashew income (GH¢ 774.00). Thus, expenditure on intermediate inputs, services and labor for further cashew production exceeds the income from cashew production by 191.2 %, which is consistent with the GLSS 4 & 5 results. In 2010, which covers only the first three and half months of the year, the internal purchase index is only 70.6 % of the cashew income. Thus GH¢ 70.60 of every GH¢ 100.00 Ghana Cedi of output from the cashew farming is spent for the purchase of intermediate goods, services and labor to be used in subsequent production. It is expected that further expenditures will be incurred during the rest of the year (without accompanied income) which will increase the index for 2010.

**Table 11: Index of Internal Purchases for 2009 and 2010**

<b>All intermediate goods, services and labor (Inputs)</b>		
	<b>2009</b>	<b>2010</b>
<b>Average expenditure of household on input</b>	2,253.87	1,251.82
<b>% of Expenditure of Household on input to average income from cashew farming</b>	291.2	70.6

### 4.3 Sub-National Level Income and Employment Multipliers

Following from equation (3) in the previous section, **direct and indirect income multipliers (Type I multiplier)** is computed and shown in Table 12.

**Table 12: Direct and Indirect Income Multipliers (Type I Multiplier) for 2009 and 2010**

Type I multiplier for 2009		Type I multiplier for 2010	
Variable	Computed value	Variable	Computed value
$h_{oi}$ = 1 - (Imputed average value of household labor services/Average Agricultural sector expenditure)	0.24	$h_{oi}$ = 1 - (Imputed average value of household labor services/Average Agricultural sector expenditure)	0.23
$b_{ij}$ = the Leontief Coefficient	0.58	$b_{ij}$ = the Leontief Coefficient	0.58
$h_{oj}$ = (Imputed average value of household labor services/Average Agricultural sector expenditure)	0.76	$h_{oj}$ = (Imputed average value of household labor services/Average Agricultural sector expenditure)	0.77
<b><math>{}_1m_j</math> = Direct and Indirect income multiplier for 2009</b>	<b>0.18</b>	<b><math>{}_1m_j</math> = Direct and Indirect income multiplier for 2010</b>	<b>0.17</b>

The **Type II income multipliers (direct, indirect and induced effects)** can be obtained as a multiple of a constant term  $\theta$  of the type I income multiplier as in equation (4) in the previous section and shown in Table 13.

**Table 13: Type II Income Multipliers (Direct, Indirect and Induced Effects) for 2009 and 2010**

Type II income multipliers for 2009		Type II income multipliers for 2010	
Variable	Computed value	Variable	Computed value
${}_1m_j$ = Direct and Indirect income multiplier for 2009	<b>0.18</b>	${}_1m_j$ = Direct and Indirect income multiplier for 2009	<b>0.17</b>
$g$ (Annual expenditure per household/average income per household)	0.52	$g$ (Annual expenditure per household/average income per household)	0.36
$H$ (Cost of labor/total cost of cashew farming)	0.76	$H$ (Cost of labor/total cost of cashew farming)	0.77
$B$ (Leontief coefficient obtained from SAM)	0.58	$B$ (Leontief coefficient obtained from SAM )	0.58
$F$ (Deflated average annual expenditure by household from survey/Region's household average expenditure from GLSS 5)	0.90	$F$ (Deflated average annual expenditure by household from survey/Region's household average expenditure from GLSS 5)	0.49
$\theta = [1 - (g + HBF)]^{-1}$	12.5	$\theta = [1 - (g + HBF)]^{-1}$	2.33
${}_2m_j$ = <b>The type II income multipliers (direct, indirect and induced effects)</b>	<b>2.25</b>	${}_2m_j$ = <b>The Type II income multipliers (direct, indirect and induced effects)</b>	<b>0.40</b>

The **direct employment multipliers** can be obtained as the ratio of employment and output for each sector. The type I employment multipliers  ${}_1e_i$  is given by equation (6) is shown in Table 14.

**Table 14: Direct Employment Multipliers for 2009 and 2010**

Direct employment multipliers for 2009		Direct employment multipliers for 2010	
Variable	Computed value	Variable	Computed value
$p_{oi} = 1 - (\text{Average household expenditure on labor/average household income on cashew sales})$	0.16	$p_{oi} = 1 - (\text{Average household expenditure on labor/average household income on cashew sales})$	0.12
$b_{ij}$ (Leontief coefficient)	0.58	$b_{ij}$ (Leontief coefficient)	0.58
$p_{oj} = (\text{Average household expenditure on labor/average household income on cashew sales})$	0.84	$p_{oj} = (\text{Average household expenditure on labor/average household income on cashew sales})$	0.88
${}_1e_i = \frac{\sum_{i=1}^{n-v} p_{oi} b_{ij}}{p_{oj}}$ (Type I employment multipliers)	<b>0.11</b>	${}_1e_i = \frac{\sum_{i=1}^{n-v} p_{oi} b_{ij}}{p_{oj}}$ (Type I employment multipliers)	<b>0.08</b>

The Type II employment multiplier ( $\lambda_{e_i}$ ) given by equation (7) in the previous section is shown in Table 15.

**Table 15: Type II Employment Multipliers for 2009 and 2010**

The Type II employment multiplier for 2009		The Type II employment multiplier for 2010	
Variable	Computed value	Variable	Computed value
$P_{oi} = 1 - (\text{Average household expenditure on labor/average household income on cashew sales})$	0.16	$P_{oi} = 1 - (\text{Average household expenditure on labor/average household income on cashew sales})$	0.12
$b_{ij} = (\text{Leontief coefficient})$	0.58	$b_{ij} = (\text{Leontief coefficient})$	0.58
$h_{oi} = 1 - (\text{Imputed average value of household labor services/Average Agricultural sector expenditure})$	0.30	$h_{oi} = 1 - (\text{Imputed average value of household labor services/Average Agricultural sector expenditure})$	0.25
$p_{oj} = (\text{Average household expenditure on labor/average household income on cashew sales})$	0.84	$p_{oj} = (\text{Average household expenditure on labor/average household income on cashew sales})$	0.88
$\text{PBF}[1 - (g + \text{HBF})]^{-1}$	0.03	$\text{PBF}[1 - (g + \text{HBF})]^{-1}$	0.20
<b>Type II employment multipliers (2009)</b>	<b>0.12</b>	<b>Type II employment multipliers (2010)</b>	<b>0.11</b>

#### 4.4 Regional Income Multipliers

Following from equation (8) in the previous section, the computed regional income multipliers for 2009 and 2010 seasons are shown in Table 16.

**Table 16: Regional Income Multipliers for 2009 and 2010**

<b>M=Regional Income Multiplier (2009)</b>		<b>M=Regional Income Multiplier (2010)</b>	
<b>Variable</b>	<b>Computed value</b>	<b>Variable</b>	<b>Computed value</b>
$a_n$ = the Leontief Coefficient for intermediate demand	0.58	$a_n$ = the Leontief Coefficient for intermediate demand	0.58
$\beta_n$ = the marginal (incremental) share of total expenditure on non-tradable;	0.08	$\beta_n$ = the marginal (incremental) share of total expenditure on non-tradable;	0.08
$v$ = the share of gross output in the regional economy that goes to household income	0.15	$v$ = the share of gross output in the regional economy that goes to household income;	0.25
$s$ = leakage from the regional economy in the form of taxes and savings	0.09	$s$ = leakage from the regional economy in the form of taxes and savings	0.18
<b>M = Regional Income Multiplier (2009)</b>	<b>2.43</b>	<b>M = Regional Income Multiplier (2010)</b>	<b>2.48</b>

Table 17 below shows the summary of all relevant multipliers computed in the study. The Direct and Indirect (Type I Income Multipliers) for 2009 and 2010 are 0.18 and 0.17 respectively. The Direct, Indirect and Induced (Type II Income Multipliers) for 2009 and 2010 are 2.25 and 0.4 respectively. The Direct Employment Multipliers (Type I Employment Multipliers) for 2009 and 2010 are 0.11 and 0.08 are respectively. The Type II Employment Multipliers for 2009 and 2010 are 0.12 and 0.11 respectively. The Regional Income Multipliers for 2009 and 2010 are 2.43 and 2.48 respectively.

In 2009, the highest multiplier among the computed multipliers is the Regional Income Multiplier (2.43), indicating that cashew production and exports activities have great impact on incomes of individuals involved in these activities in the regional economy. This is followed by Type II Income Multipliers (2.25), and then Type I Income Multipliers (0.18), and then by Type II Employment Multiplier (0.12), followed by the Type I Employment Multipliers (0.11), showing the relative impacts of cashew production and export activities on each of these variables within the households.

Also, in 2010 the highest multiplier among the computed multipliers is the Regional Income Multiplier (2.48), indicating that cashew production and exports activities have great impact on incomes of individuals involved in these activities in the regional economy. This is

followed by Type II Income Multipliers (0.40), and then Type I Income Multipliers (0.17), and then by Type II Employment Multiplier (0.11), followed by the Type I Employment Multipliers (0.08), showing the relative impacts of cashew production and export activities on each of these variables within the households.

In general, cashew production and export activities aided by the West Africa Trade Hub are beneficial to the creation of employments and incomes, not only within households in the Brong Ahafo region but also in the regional economy as a whole.

**Table 17: Summary of Computed Multipliers**

<b>Multipliers</b>	<b>2009</b>	<b>2010</b>
Direct and Indirect (Type I Income Multipliers)	0.18	0.17
Direct, Indirect and Induced (Type II Income Multipliers)	2.25	0.40
Direct Employment Multipliers (Type I Employment Multipliers)	0.11	0.08
Type II Employment Multipliers)	0.12	0.11
Regional Income Multipliers	2.43	2.48

## 5. Conclusions and Policy Recommendations

This study was commissioned by USAID to assess the impact of the Trade Hub's export-promotion work and to obtain a better understanding of how increased exports by individual farmers/firms translate into systemic changes within the larger value chains of which they are a part. Its goal was to quantify the effects of trade and value chain transformation on the regional economy of West Africa. This study fell within a broader research agenda which was to develop a method of estimating the household-income effects of export-promotion activities in West Africa, specifically, Burkina-Faso, Côte d'Ivoire, Ghana and Mali.

The Department of Agricultural Economics and Agribusiness, University of Ghana's research objective for was to determine the current and potential future contributions of the cashew sector to employment and income generation in Ghana. Both primary and secondary data were required for the study.

For the primary data, the team developed structured questionnaires, pre-tested and administered to individual cashew farmers, cashew transporters and cashew farmers associations over two separate periods (before the cashew harvest started in February 2010 – which represents the impact for 2009 cashew activities (first round), and after the cashew harvest at the end of April 2010 (second round)). This enabled the team to assess the impact of cashew activities before and after harvest. The team sampled cashew farmers and cashew transporters in the Brong-Ahafo Region (Jaman North, Jaman South, Drobo, Techiman, Wenchi, Nkoranza, Kitampo North, and Kitampo South Districts); the Northern Region (Bole District) and Ga in the Upper West Region. Further, the team interviewed all existing and functioning cashew farmers' associations in the Brong-Ahafo Region. For the first round of data collection (February 2010) the team interviewed 80 cashew farmers, 8 cashew transporters, 27 cashew associations; and for the second round (end of April 2010) the team interviewed 67 cashew farmers, 10 cashew transporters and 29 cashew associations. For the secondary data, the team used relevant data from GLSS 4 & 5, and the Ghana Social Accounting Matrix 2005.

The average quantity of land cultivated to cashew per household in 2009 and 2010 was 6.8 and 7.2 hectares respectively. The difference in cultivated land area was due to slightly different farmers covered in the two surveys. Most of the larger farms covered in the second survey were in Jaman district increasing household cultivated farms by an additional 0.8 hectares of cashew in 2010.

The average cashew income of all households surveyed increased from GH¢ 774.00 in 2009 to GH¢ 1,772.00 in 2010. The average income from other crops decreased from GH¢ 2,721.00 in 2009 to GH¢ 1,063.00 in 2010. The average non-crop incomes per household for 2009 and 2010 were GH¢ 2,421.00 and GH¢ 812.00 respectively. Furthermore it has been estimated that the average annual revenue from non-crop income in 2009 is about 30% of the average annual expenditure on all goods and services consumed by the farm households in the same year. However in 2010, the estimated average non-crop income was only about 53% of the average expenditure in the same year.

In 2009, the average annual expenditure by cashew transporters in the overall sample was GH¢ 17,751.50 as compared to GH¢ 15,061.00 in 2010. The major expenditures were on fuel and tires which are all imported goods. The expenditure values for 2010 were lower because they covered only the first third of the year. However, the expenditure structure was identical for both 2009 and 2010. Cashew transporters in Kintampo North District had a greater share (70%) of the income from the cashew transport business as compared to transporters in Wenchi District where incomes from cashew transportation made up only 13% of the entire

income from transport business. Although the monetary value of income generated from transporting cashew in 2010 was lower, the percentage share of this revenue in total income from the transport business increased from 27% in 2009 to 44% in 2010. Surprisingly, in Kintampo North District the cashew transport income is on average only GH¢ 150.00, accounting for only 2% of the overall transport business. This could be attributed to the fact that most of the producers and associations directly involved in marketing cashews are holding their cashew in anticipation of increasing future prices. However, in Jaman South District the percentage share of the income earned from cashew transport for transporters interviewed was the same as that from the entire transport business.

The overall sample revealed that the average expenses by the cashew associations is GH¢ 1,133 in 2009 as compared to GH¢ 2,584 in 2010, an increase of about 128%. However, with the exception of Wenchi, Techiman and Nkoranza Districts together experienced a decline in the expenses (91%) made in 2010. Jaman South and North, and Kintampo South and North Districts observed an increase of 322% and 13% respectively. On average labor cost was observed to be the dominant cost item in the associations' expenditure in both 2009 and 2010. Labor cost was 46.8% in 2009 and 81.7% in 2010. Almost all expenditures, except elements of phone bills, transport and electricity, are domestic non-tradable expenses.

The index of internal purchases measures the proportion of income from cashew production that is spent by household on inputs for further production of cashew. The data available shows that in 2009 on average each respondent spent GH¢ 2,253.87 on inputs, which is 291.2% of average cashew income (GH¢774.00). Thus, expenditure on intermediate inputs, services and labor for further cashew production exceeds the income from cashew production by 191.2 %, which is consistent with the GLSS 4 & 5 results. In 2010, which covers only the first three and a half months of the year, the internal purchase index is only 70.6 % of the cashew income. Thus GH¢ 70.60 of every GH¢ 100.00 of output from cashew farming is spent on purchases of intermediate goods, services and labor to be used in subsequent production. It is expected that further expenditures will be incurred during the rest of the year (without accompanied income) which will increase the index for 2010.

In 2009, the highest multiplier among the computed multipliers was the Regional Income Multiplier (2.43), indicating that cashew production and exports activities have great impact on incomes of individuals involved in these activities in the regional economy. This is followed by Type II Income Multipliers (2.25), and then Type I Income Multipliers (0.18), and then by Type II Employment Multipliers (0.12), followed by the Type I Employment Multipliers (0.11), showing the relative impacts of cashew production and export activities on each of these variables within the households.

Also, in 2010 the highest multiplier among the computed multipliers was the Regional Income Multiplier (2.48), indicating that cashew production and exports activities have great impact on incomes of individuals involved in these activities in the regional economy. This is followed by Type II Income Multipliers (0.40), and then Type I Income Multipliers (0.17), and then by Type II Employment Multipliers (0.11), followed by the Type I Employment Multipliers (0.08), showing the relative impacts of cashew production and export activities on each of these variables within the households.

In general, cashew production and export activities aided by the West Africa Trade Hub are beneficial to the creation of employments and incomes, not only within households in the Brong Ahafo Region but also in the regional economy as a whole.

However, the cashew farmers, transporters and associations mentioned the following problems in the performance of their activities: fluctuating and relatively low prices for their

produce, high fuel cost, high cost of inputs, exploitation by cashew buyers/exporters, unavailability of processing facilities (for both cashew nuts and apples), and relatively bad roads from farms to tarred roads, as well as high incidence of bush fires, which have implications for the development of agricultural policy in Ghana.

Even though these multipliers are high, they could be higher if the internal processing of most of the output (cashew nuts) was done domestically. The same can be said for the processing of the cashew apples. As such, with the current support from the West Africa Trade Hub and the Cashew Development Project in terms of area expansion and improved planting material supply resulting in higher yields, efforts are needed to initiate cashew apple processing and also increase cashew nut processing to further enhance the multiplier effects.

There is a need to strengthen existing cashew associations to negotiate for better producer prices which is also impacted by institutional incoherence in the transport sector. Government should use policy to reduce barriers along the trading route.

The magnitude of economic benefit is tied to the level of the industry's production. In the case of cashew, production is in turn tied to the number of hectares under cultivation and the average yield of these hectares. The total hectareage is the key variable to the total economic benefit that the industry generates. Current hectare expansion support by the Ghana Government and West Africa Trade Hub must continue.

The cashew sector (cashew nuts, cashew kernel, and cashew apple processing) must be profitable and not depend on subsidies for a positive economic benefit to accrue to households and the regional economy. Thus, Government support must be specific, time-bound and transparent to remove identified constraints within the industry - which prevents profitable production of the crop – and tackle inefficiencies within the sector.

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