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**Shea Butter Markets:
Their Implications for Ghanaian
Shea Butter Processors and Exporters**

January 1999

Project A0772

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Report no. 2403

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Exchange rate US\$1 = 2,310 Cedis (November 1998)

Abbreviations: CPHP Crop Post Harvest Programme
 NRI Natural Resources Institute
 SBC The Shea Butter Company
 TAAP Tamale Archdiocesan Agricultural Programme
 TCC Technology Consultancy Centre

Summary

1. This report was written for the Crop Post Harvest Programme. It examines shea butter market developments and suggests ways that the programme can develop the shea butter research that it has already conducted in Ghana. The report also suggests new research avenues that will assist the development of the Ghanaian shea butter industry.
2. International demand for shea butter is driven by the confectionery and cosmetics companies. Over the next few years, the confectionery industry, by far the largest shea butter consumer, is likely to increase its orders for shea butter to keep pace with growing demand in Eastern Europe and Japan. Expected EU legislative change to allow greater use of non-cocoa vegetable fats in chocolate will also boost demand for shea butter. Tight environmental legislation in Japan and Europe is persuading buyers to purchase shea butter in West Africa, rather than import shea nuts and extract shea butter themselves.
3. The cosmetics industry is also buying increasing quantities of shea butter. Again, there is a growing tendency to source shea butter directly from West Africa.
4. These market developments are being reflected in Ghana, where supply of crude shea butter can not keep pace with demand. Demand also comes from Ghanaian cosmetics manufacturers, although such companies usually require refined shea butter, a product in which Ghana has yet to develop a competitive advantage.
5. The Ghanaian shea butter processing industry is constrained by poor access to shea nut producing areas, by a lack of working capital among small scale processors, and, on occasions, by indifferent quality.
6. The report recommends:
 - Pilot research to test the financial and technical performance of competing shea butter extraction technologies.
 - Research into utilisation of shea butter processing by-products, with a view to increasing industry profitability
 - Research into improved shea nut harvesting, handling and storage practices.
 - The involvement of reputable NGOs to encourage greater integration of small-scale processors with shea butter buyers, especially at the financing level.

1. Introduction

Shea butter is a vegetable fat processed from the seeds of a tree that grows in savannah Africa. In Ghana, its production is restricted to the three most northerly regions. Processing is traditionally conducted by women, and most of their produce is sold for local use, either as cooking fat or as a skin moisturiser.

DFID's Crop Post Harvest Programme (CPHP) first became involved with shea butter processing in Ghana through a research project titled "Improved Processing of Shea Nuts in Northern Ghana". The project, a collaboration between NRI in the UK and the TCC and TAAP in Ghana, developed a shea butter extraction bridge press that successfully overcomes three constraints inherent to the traditional process. The new technology decreases labour inputs (and drudgery), and eliminates the need for water and firewood, both of which are generally scarce in shea processing areas.

While its technical performance is impressive, the bridge press appears to offer little financial advantage over the traditional method (although if the press was adopted on a widescale, the economic advantages to the region in terms of reduced firewood consumption would be considerable). Analysis conducted by NRI's Ann Gray in 1997 (CPHP project R6631) indicates that financial returns from using the bridge press may only be marginally greater than the very low returns from the traditional method. The bridge press does however substantially increase labour productivity, suggesting that its adoption could release female labour for household or other income earning activities. But as Ann points out, apart from during the harvest, women shea butter processors usually attach little value to spare time.

There is also the possibility that increased labour productivity could allow women processors to increase their output of shea butter, thereby offsetting low margins with higher turnovers. However, women processors generally have little excess cash to use as working capital, and consequently can not build sufficient stocks of shea nuts to increase their butter output.

Ann Gray's report includes a section that highlights domestic and overseas shea butter demand for use as an ingredient in various manufacturing processes. A thorough examination of these markets fell outside the scope of her research, although she concludes that there may be potential for linking small scale processors with the markets. The inference is that the bridge press would help processors to produce high quality shea butter in volumes that would be sufficiently large both to interest local buying agents and to give a reasonable return to processors.

At the end of 1997, TechnoServe (TNS) in Ghana approached NRI to request its involvement in the development of refining technology that would allow small scale processors to sell high quality refined shea butter to cosmetics industries in developed countries. TNS had received enquiries from two US cosmetics companies who wished to purchase refined shea butter from Ghana, and, partly on the basis of these, TNS believed that a significant opportunity existed for Ghanaian small-scale processors to supply unfulfilled world demand for refined shea butter.

However, before engaging in such research, NRI requested CPHP funds to investigate international and Ghanaian shea butter markets. The intention was to inform the

CPHP how it can further its previous shea butter research, and how to develop new avenues of research, possibly in line with TNS's programme. The CPHP manager agreed to fund the research and the following terms of reference were agreed.

1. Review Ghanaian and international shea butter market trends to see what implications they have for the Ghanaian shea butter industry.
2. Suggest appropriate developmental assistance for the Ghanaian shea butter industry, and if appropriate, avenues for further CPHP applied research.

2. Shea Butter Uses in Manufacturing Industries

This section summarises the major manufacturing uses of shea butter, available information on quantities used, regulatory developments, market trends and shea butter's position relative to competing substitutes.

By far the greatest use of shea butter is in the manufacture of a variety of Cocoa Butter Equivalent (CBE). This highly processed product is a substitute for cocoa butter in chocolate. The second greatest manufacturing user of shea butter is the cosmetics industry, which is increasingly exploiting shea butter's skin moisturising and healing properties.

Other manufacturing uses are in the pharmaceutical and edible fats industries. The research for this report uncovered little evidence of pharmaceutical uses of shea butter. The British and the International Pharmacopoeias do not list shea butter as a pharmaceutical, and neither Glaxo Wellcome nor Smithkline Beecham use shea butter in their products. The only references we discovered during our research were in medical research papers and discuss shea butter's use in suppositories and dermatological creams.

A Danish company, Aarhus Olie, is the only large scale company that manufactures edible fats and oils from shea butter. Aarhus closely guards information on all its manufacturing activities and consequently our research failed to discover anything about this market.

This report only presents information on confectionery and cosmetic manufacturing uses of shea butter. We are confident that demand from these industries accounts for an overwhelmingly large proportion of total world commercial demand.

2.1 International Shea Butter Trade Statistics

Unfortunately, international trade commodity codes group shea butter with several other vegetable fats, leaving no way of identifying how much shea butter is traded. Shea nuts, on the other hand, do have a separate commodity code, although a review of statistical sources reveals some curious and inexplicable patterns.

Year	1992	1993	1994	1995	1996
Denmark	0	0	0	0	45,133
Faeroe Islands	0	0	0	1	1
France	115	144	265	140	0
Greece	0	12	0	0	0
India	0	0	0	273	273
Ireland	12	0	0	0	0
Italy	0	2	0	0	16
Japan	5,076	0	0	0	0
Malaysia	8	1	0	0	166
Netherlands	4	5	10	0	0
Sweden	1,369	2,936	11,130	9,054	13,352
Togo	2,363	408	526	526	526
Turkey	0	0	0	0	8
UK	0	0	0	1,401	0
USA	0	0	0	2	26
Total	8,947	3,608	11,931	11,397	59,501

Source: FAOSTAT

For example, a mystery surrounds why Denmark, a major shea butter CBE producer, should have imported no shea nuts between 1992 and 1995, and then imported 45,000 tonnes in 1996 (Table 1). Similarly, the Netherlands is another major shea butter CBE producer, yet apparently imported tiny quantities of shea nuts between 1992 and 1996. The Dutch use the services of a UK toll crushing company, yet UK statistics register only a small volume of imports over the period, and certainly not enough to keep a major CBE processing plant supplied with shea butter.

2.2 Cocoa Butter Equivalent (CBEs)

Cocoa butter gives chocolate its texture. It melts at body temperature and gives that familiar sensation in the mouth. However, it is expensive, and for many years the confectionery industries in several countries have been using alternatives to reduce the quantity used. CBEs are the closest substitutes for cocoa butter, and among CBEs, those manufactured from shea butter are generally regarded as among the best.

The shea butter CBE manufacturing process involves extracting triglyceride fractions that have the same melting point as cocoa butter. The process is highly specialised and conducted by only a few companies in Europe and Japan. In Europe, Aarhus Olie in Denmark, Karlshamns in Sweden, and Unilever (Loders Croklaan) in Holland, manufacture CBEs from shea butter. In Japan, Fuji Oils is the major producer.

For many years, the European CBE manufacturers and their trade association, FEDIOL, have been lobbying the European Commission to harmonise EU legislation

to allow the inclusion of non-cocoa vegetable fats in chocolate in all EU countries. Currently only the UK, Ireland and Denmark permit the use of such fats up to the technical maximum inclusion rate of 5%. Opposition to legislative change appears to come from two quarters. Firstly, there is what can be described as the “real chocolate campaign”. Some chocolate manufacturers in countries such as France claim that chocolate can only be chocolate if it does not include non-cocoa vegetable fats. In the spirit of compromise, the EC is suggesting strict labelling standards that would clearly identify chocolate that contains non-cocoa vegetable fats. Secondly, there are concerns that cocoa exporting countries will suffer lost revenues from lower cocoa butter exports. In response, the EC has suggested that only oils and fats that originate in tropical countries should be permitted, thereby partially compensating the developing world for lost revenues, albeit that some countries will gain at the expense of others.

In mid 1998, hopes were high that an agreement on the inclusion of non-cocoa vegetable fats throughout the EU was imminent. Unfortunately, these hopes were ill-founded and the debate continuous. Progress has been made however, and legislation that will have the effect of increasing demand for non-cocoa vegetable fats will probably emerge sooner or later.

Another development in the CBE market has occurred in Eastern Europe. Before the collapse of communism, several Eastern European countries were major consumers of CBEs. The economic hardships of the early nineties caused chocolate consumption to drop dramatically, but in the healthier economic climate of recent years, several countries have restored demand to previous levels.

In the past, the major shea butter CBE companies have preferred to import shea nuts and conduct their own crushing, thereby ensuring that they are using the best quality ingredients in their manufacturing processes. However, environmental concerns in developed countries are beginning to force companies to rethink. Legislation in Japan and the EU is increasingly discriminating against the smells and effluents associated with oil seed crushing. Aarhus is now the only European company that continues to crush its own shea nuts. Unilever use independent toll crushers in the UK, and within the last year, Karlshamns has sold its crushing mills. In Japan, Fuji Oils only imports shea butter, leaving the extraction process to companies in countries of origin.

Shea butter CBEs have to compete with CBEs produced from palm oil mid-fraction, illipe oil (from the nuts of the mahwa tree, found mainly in Indonesia and Malaysia), and sal fat (from the sal tree in India). Of these competing fats and oils, palm oil mid-fraction is dominant, and sal fat is generally regarded as inferior. Illipe oil has become scarce since Indonesian government forestry burning policies have dramatically reduced yields (pers. comm., Indonesian crushing company). The competitive position of shea nuts and butter is therefore quite strong, and at least for the time being, supply can not keep pace with demand. The shea butter CBE manufacturers are keen to import either nuts or butter, in an attempt to keep their factories supplied with raw materials. These companies are unlikely to change their processes to suit other fats and oils because they have invested heavily in highly specialised processing technology for transforming shea butter into CBEs.

In the usual sense of world markets, in which hundreds of transactions occur each day and futures contracts and published spot prices exist, there are no world markets in shea butter and shea nuts. Too few buyers and sellers exist for such markets to have emerged. Trade is usually conducted under long standing arrangements between organisations that know and trust each other.

One of the major influences on shea butter prices is the price of cocoa butter. Unsurprisingly, shea butter prices move in sympathy with cocoa butter prices. However, the correlation is not so good as to allow hedging of future shea nut purchases using cocoa butter futures contracts, as one or two traders have found to their cost (pers. comm., shea nut and butter trader)

In summary, excluding the possibility of a cocoa butter world price collapse, future demand for shea butter as a CBE ingredient looks healthy. Expected changes to EU chocolate regulations, an improvement in CBE demand in both Eastern Europe and Japan, and the continued scarcity of illipe oil, suggest that African shea nut and butter traders can expect to receive a growing number of export enquiries. Furthermore, tight environmental legislation in developed countries suggests that the shea butter CBE manufacturers will increasingly wish to import shea butter rather than shea nuts. African shea butter processors can also look forward to increased business.

We feel we should place only one caveat on this rosy forecast. Future CBE sales growth will be hotly contested by manufacturers of palm oil mid-fraction CBEs. Shea butter suppliers and CBE manufacturers will have to fight hard for their share of market growth.

2.3 Manufacturing Uses In Cosmetics Industries

International shea butter demand from cosmetics companies is a fraction of CBE demand. Yet while a mere 5% of world shea nut and butter trade finds its way into cosmetics, consumption is growing (Marche Tropicaux 1995). And because shea butter has unusual skin moisturising and healing properties, cosmetics companies are generally willing to pay more than CBE companies.

According to TECO Finance, a shea butter processing company in France, most cosmetics laboratories in Europe and the USA already use shea butter in at least some of their formulations, particularly in skin moisturisers, shampoos, hair lotions and soaps. A favourite marketing ploy in the US is to appeal to Afro-Americans by dwelling on shea butter's African origins. In Europe, shea butter is often included in cosmetics formulations (albeit often in small percentages), without specific reference to it in marketing strategies.

To understand the nature of the cosmetics industry's demand for shea butter, a discussion of processing techniques is important. Two methods of shea butter extraction are used commercially. Crushing is simply a mechanical method of squeezing the butter from the nuts. Solvent extraction, although usually preceded by crushing, uses a flammable solvent, hexane, to extract virtually all fat from oilseed cake. Yields are considerably higher and the cost of the extracted butter is consequently lower. For example, TECO Finance sells solvent extracted shea butter

at a price 27% lower than the price of shea butter extracted by crushing. However, solvent extraction is a potentially dangerous process and does not lend itself to small scale extraction. The minimum throughput is estimated at 200 tonnes of nuts per day (pers. comm., Food Security Department, NRI). Crushing, on the other hand, is suitable for small and medium scales of production.

Cosmetics companies that promote their products using organic or green concepts are more likely to require shea butter extracted by crushing, thereby avoiding the connection with hexane. Other companies, more mindful of costs, buy solvent extracted shea butter. There is no evidence to suggest butter from either process has superior cosmetic qualities (TECO Finance, web pages).

Some cosmetics formulations require refined shea butter, which has no odour, colour or acidity. An unfortunate effect of the refining process is that it removes vitamins that make shea butter so beneficial to the skin. Some of the extracted vitamins are anti-oxidants which naturally suppress the onset of rancidity. These natural substances have to be replaced by artificial alternatives. Prices for refined shea butter are typically 40% higher than unrefined butter prices.

The refining process is a medium scale operation with a minimum economic throughput of approximately one tonne per day, and this for a high value product only (pers. comm., Food Security Department, NRI). The process is not suitable for smaller scales of production.

The cosmetics shea butter processing industry has traditionally been concentrated in Europe, particularly in France, Belgium and Holland. Recently however, some cosmetics companies have started purchasing refined and unrefined shea butter directly from African processors, either in the attempt to reduce raw materials costs, or to engage in fair trade (trade that has social as well as commercial objectives).

In summary, while statistics on the size and growth of cosmetics demand for shea butter are unavailable, contact with cosmetic companies has led us to conclude that demand is strong and consumer interest in the product is growing. Providing that African processors and traders can compete in terms of price, quality and service, they will be in a good position to benefit from market growth. However, processors entering the industry should think carefully about what type of processing they engage in. Solvent extraction is clearly beyond the financial means of most African companies. Shea butter refining, although accessible to medium sized enterprises, should only be considered if companies can tap into sustained demand. Colourless and deodorised shea butter is a specialised product that, unlike unrefined shea butter, does not find a ready market outside the cosmetics industry.

3. Ghana's Position In International Shea Butter Markets

According to FAOSTAT, between 1992 and 1996 the principal shea nut exporting countries in order of importance were Benin (44,000 tonnes), Ghana (44,000 tonnes), Cote d'Ivoire (35,000 tonnes), Burkina Faso (30,000 tonnes), Togo (23,000 tonnes), Nigeria (8,000 tonnes) and Mali (3,000 tonnes). On occasion, FAO statistics have

been known to be a little wide of the mark, and so the absolute quantities and rankings given above may not truly reflect reality. However, there is no doubt that the listed countries are indeed the world's principal shea nut exporters.

In addition to the volumes given above, significant quantities of shea butter will also have been exported during the period. Unfortunately, international trade commodity codes do not identify shea butter as a distinct product, and consequently there is no way of telling how much butter was exported. However, of the countries listed, Burkina Faso, Mali, Cote d'Ivoire and, more recently, Ghana, have developed significant industrial shea butter processing capacities. Processing in the three francophone countries has traditionally been oriented towards supplying demand from local cosmetics and soap industries. By contrast, Ghana's commercial production capacity has arisen to supply export markets.

Several contacts made during the course of this research commented on the high quality of Ghanaian shea nuts, which tend to produce butter with lower free fatty acid content than nuts from other West African countries.

4. Manufacturing Industry Demand For Ghanaian Shea Butter

This section examines commercial buyers of Ghanaian shea butter, quantities demanded, quality requirements, and price premia for quality.

4.1 Domestic Demand

Lever Brothers (Ghana): This company, a subsidiary of Unilever, launched a skin moisturising product called "Vaseline Shea Butter" in 1996. While Lever Brothers claim that the product was successful, sales were well below target for 1996/97 and 1998. The company claim that this was a result of technical production problems rather than poor market performance. Future plans call for production to be raised to between 150 and 200 tonnes a year. Given that shea butter accounts for a high percentage of the product weight, future shea demand from Lever Brothers should be significant. The company currently sources refined shea butter from Cote d'Ivoire at a price of 2450 Cedis (US\$1.06) per kilogram, including 12.5% duty. Trials to produce the butter in Ghana have so far proved unsatisfactory because price and quality have been uncompetitive with the Ivorian product. Lever Brothers is nevertheless keen to buy locally, not least to overcome cumbersome customs bureaucracy between Ghana and Cote d'Ivoire.

Johnson Wax: This multinational subsidiary launched two shea butter products onto the Ghanaian market in 1996, yet withdrew both due to poor sales and quality problems. The company wishes to re-introduce their products, providing that it can find sources of high quality shea butter supply.

Other sources of domestic commercial demand: Several small cosmetics manufacturers demand limited quantities of shea butter annually, possibly amounting to no more than one tonne. They generally purchase traditionally processed butter either from markets in Accra or through agents in the north of the country.

4.2 International Demand

Aarhus Olie: Aarhus started buying shea butter from Ghana in 1997, having previously purchased only shea nuts. In 1998 the company established an office in Tema to co-ordinate procurement and shipping. The Ghanaian manager of the office claims that Aarhus has plans to increase annual shea butter purchases from the current level of 100 tonnes to 1,000 tonnes. These developments suggest that Aarhus is responding to EU environmental legislation pressures in Europe by opting to buy more shea butter at source. The company currently purchases from a commercial processor in Tamale but has in the past purchased traditionally processed shea butter via an agent. Aarhus currently offers an FOB shea butter price of US\$0.80 per kg, and pays a 10% premium for butter that exceeds certain quality criteria.

Itochu: This Japanese multinational buys shea butter on behalf of Fuji Oils. The company has a long standing relationship with Kassardjian (see section 5.2), a processing company based in Tamale, northern Ghana. The quantity of butter purchased is not known. Itochu is happy with their purchasing arrangements, and are not currently looking for alternative sources of supply, even though Kassardjian is reportedly unable to supply the quantity of butter that Itochu requires.

Karlshamns and Unilever: These two CBE manufacturers reportedly buy butter from Kassardjian. Details of price, quantity and quality are unavailable.

OLAM: OLAM is an international trading company based in Singapore. Its Ghanaian operations have been active for four years and have concentrated on shea nuts, shea butter, cashew nuts and coffee. In its shea nut and butter operations, the company acts as an intermediary between local sources of supply and multinational companies, such as Unilever (Loders Croklaan), to which it supplies shea nuts, and Aarhus International, to which, in the past, it has supplied both industrially and traditionally processed shea butter. The company may also have smaller clients who purchase shea butter. OLAM does no processing itself but has two laboratories in the north of Ghana to test the quality of shea nuts and shea butter. It also runs a network of ten buying points and 20 warehouses in the north of Ghana, although we assume that this network is not devoted entirely to shea nuts and butter. At the time of our field research, the company was reported to be holding 60 tonnes of unsold butter, apparently as a speculative venture.

The Shea Butter Company (SBC): SBC is a Chicago based cosmetics company that has shown interest in buying refined shea in Ghana for the past two years. However, until recently, prices quoted by Ghanaian refineries have been too high for SBC. The company has opted for suppliers in Cote d'Ivoire and buys 7 tonnes per quarter. At the end of last year, SBC placed a trial order of 14 tonnes at a price of about 3,200 Cedis/kg (US\$1.39) with Bosbel, a processor and refiner based in Tamale, northern Ghana. SBC plans to expand demand to 50 tonnes a year, although it is not committed to buying in Ghana.

The Body Shop: This well known British cosmetics manufacturer and retailer, purchases traditionally processed shea butter from women's groups in northern

Ghana, under the company's much publicised fair trade initiative called the Community Trade Programme. The Body Shop's local agent, Wonoo Ventures, purchases the butter from an association of women's processor groups and exports to Holland, where the butter is refined before being sent to the UK. The Body Shop is reported to remunerate the processors at higher than local market prices. In addition, a premium is paid to the association for community projects. The Body Shop claim to purchase 30 tonnes per annum, a quantity that satisfies all their current needs. The company is tied into its relationship with the processor association, and therefore it is unlikely to seek other sources of supply.

Other demand: Several trading companies export shea butter as a sideline activity. However, we believe that the trade is ad hoc and the export volume is low.

4.3 Quality Requirements

Table 2. Quality Specifications Required by Buyers of Ghanaian Shea Butter							
Company	Maximum FFA content	Maximum Peroxide Value	Maximum Anisidin Value	Maximum Diglyceride	Maximum Moisture	Maximum Impurities	Other
Aarhus*	8%	4	3	3.5	0.2%	-	
Olam	3%	-	-	-	7%	0.05%	
SBC	-	-	-	-	-	-	Refined**
Lever Bros	2%	-	-	-	-	-	-

* Pay a sliding scale premium for butter of higher quality
 ** Odourless and colourless, with the antioxidant Tocopherol added

The most commonly quoted specification is the Free Fatty Acid content. If the level of these acids is high, rancidity becomes a problem. Aarhus's higher minimum FFA content reflects the greater tolerance of their manufacturing process, which extracts specific triglyceride fractions from the butter.

Apart from Aarhus, we could find no evidence that buyers pay price premia for quality that exceeds the minimum requirements.

5. Commercial Supply Of Ghanaian Shea Butter

This section summarises Ghanaian shea butter export volumes, commercial suppliers of shea butter in Ghana, and discusses some of the problems that the industry faces.

5.1 Ghanaian shea butter export volumes

Year	Quantity* of shea butter exported (tonnes)	Quantity in tonnes exported to					
		Europe	Canada	USA	Japan	Africa	Ecowas
1993	2.00	0.6		1.94			
1994	0.04			0.04			
1995	0.47	0.02		0.25			0.2
1996	138.00	32.66	0.06	0.23	103.71	1.57	0.05
1997	504.00						

*Does not include quantity exported by exporters not registered with GEPC.

Source: Ghana Export Promotion Council, 1998

The information in Table 3 was provided by the Ghana Export Promotion Council (GEPC). Note that not all exported shea butter is included in the table because some exporters, notably OLAM, are not registered with the GEPC. Registration with GEPC is not a requirement for shea butter exporting businesses.

Importing countries in Europe are Germany, the Netherlands, Denmark, United Kingdom and Switzerland. Though the export destination breakdown for 1997 is not yet available, GEPC informed us that Denmark was the largest European importing country in 1997. The export destinations in Africa were Botswana, Zimbabwe and three ECOWAS (Economic Commission for West African States) countries, Cote d'Ivoire, Liberia and Mali.

Even allowing for the incompleteness of the data, there is evidence that Ghanaian exports of shea butter increased dramatically over the three years between 1995 and 1997, a story that was corroborated during our field visits to processors and exporters in November 1998. The value of GEPC recorded exports in 1997 was approximately US\$440,000, which gives a value per tonne of US\$815, probably FOB.

5.2 Kassardjian

Kassardjian is a medium sized company that has been involved in shea nut and coffee exporting since 1992, and later, in 1995, started processing shea nuts into butter for export.

There are about 150 women working at the processing plant, which is equipped with 2 crushers, 10 corn mills, 9 kneaders and about 100 'boiling pots'. Shea nuts are processed only from August to March, due to the seasonality of the fruit. The harvesting period of shea nuts starts in June and ends in August. Kassardjian start

buying and stockpiling nuts at the end of the harvesting season because they believe that nuts bought earlier contain a too much moisture and produce in bad butter.

Shea butter processing at Kassardjian is a partly mechanised version of the traditional process. The nuts are crushed, roasted, milled, kneaded and boiled for several hours. Except for the roasting process, which is done manually and fuelled by firewood, crushing, milling and kneading are done by mechanical means. The plant has an average production capacity of 15-18 drums (2730 - 3276 kg) of shea butter per day. Maximum capacity is 20 drums (3640 kg) of shea butter per day.

Itochu is Kassardjian's biggest shea butter customer. Unilever and Karlshamns demand smaller amounts. Demand for Kassardjian's shea butter, particularly from Itochu, outstrips production capacity and the company can not satisfy all its customers. In an attempt to address the shortfall, Kassardjian buys shea butter both from local markets and directly from traditional processors. The Association of Ghana Industries (AGI), a UNDP/Ghana Government project, has organised groups of women to supply Kassardjian with shea butter. Kassardjian has also bought a total of 45 drums (8,190 kg) of shea butter from the local market and would like to buy more if quality standards can be met.

The company has never had a problem finding a market for its shea butter. As one of the first shea butter exporters in the country, it has built a good relationship with its overseas customers. In response to what the company sees as the inevitable expansion of demand for Ghanaian shea butter, it is planning three more shea nut processing plants, one in Savlugu, one in Tamale and a third in Tema.

5.3 *Bosbel*

Bosbel is a vegetable oil milling company that started operations in 1995. The company owns a reasonably well equipped oil seeds processing, refining and deodorising plant in Tamale, northern Ghana. Initially the company was only producing groundnut and soybean oils but in 1998 it signed a contract with Aarhus to produce 60 tons of crude shea butter on a trial basis. The company had already delivered 20 tons by the end of November 1998. It has also recently received the first order to process shea nuts for OLAM and to produce refined shea butter for the Shea Butter Company. Bosbel is attempting to find other overseas buyers.

The processing plant at BOSBEL is equipped with a screw type industrial oil expeller and drying and roasting facilities. The extraction of shea butter from shea nuts is fully mechanised and the capacity of the plant is 7 tonnes/day. Bosbel plan to increase the capacity of their plant to 15 tonnes/day to meet high demand for soya bean oil. The refinery has a capacity of 1400 gallons per batch.

5.4 *AVOM – Achimota Vegetable Oil Mills*

AVOM is located near Accra. It has good extraction and refining facilities. Until recently the plant was idle. Rehabilitation was conducted just before the company was approached to conduct trials to produce refined shea butter for Lever Brothers' Vaseline Shea Butter product. The trials were unsuccessful due to unacceptably high

levels of free fatty acids. The current status of the mill is unknown, although we believe that it has unutilised capacity.

5.5 Johnson Farms Complex

Johnson Farms Complex is a private company, which has supplied Aarhus with shea nuts since the early nineties. Two years ago, the company started buying shea butter at local markets, again for export to Aarhus. Currently Johnson Farms is not exporting butter because it judges the export price to be too low.

5.6 Agents who purchase traditionally processed shea butter

Companies such as Johnson Farms Complex and OLAM that buy traditionally processed shea butter for export, employ commission agents who procure shea butter from local markets. Unlike shea nuts, which can be bought and then stored for relatively long periods, shea butter is normally bought when orders are received from importers or in some cases, when a processing company has been unable to process sufficient butter to meet export demand.

Such exporters use stationary or mobile agents, or in some cases, use both. Stationary agents rely on women processors to bring their shea butter to collection points. Exporters then send their mobile agents to collect the butter. Mobile agents also travel to smaller towns on market days to procure shea butter, which is then transported to larger warehouses and onwards to Tema or Takoradi for shipment.

5.7 Problems facing the industry

The following is a selective list of comments made by shea butter processors, buyers and exporters during field visits for this report in November 1998.

Poor transport infrastructure: This was the most widely held concern and relates to poor rural transport networks, which delay the procurement of shea butter and mean that large shea nut producing areas are inaccessible.

Packaging: Exporters that trade with more than one overseas partner are expected to package shea butter in different ways for each export destination. For example, Kassardjian is expected by Unilever to pack butter in wooden boxes, while Itochu requires metal drums, which are difficult procure in northern Ghana.

By-product utilisation: Shea nut meal, which is produced as by-product of the extraction process, is currently buried or dumped by industrial processors. The meal has a potential use as a source of protein in animal feed, yet so far, no link has been established with feed millers.

Environmental destruction: The traditional processing technique and Kassardjian's version of it, consume large quantities of fire wood, an increasingly scarce resource in northern Ghana.

Lack of working capital: Traditional processors lack working capital to purchase sufficient stocks of shea nuts. One possible solution is for shea butter buyers to extend credit to processors. However, business relationships have not developed to the stage where buyers trust processors to apply funds responsibly and to honour business agreements.

Export prices: Several companies and organisations who have recently entered the export business complain that shea butter prices offered by importers are too low. However, we suspect that this is a cost of production problem, rather than a price problem. The new entrants may not yet have rationalised their production systems or received sufficient orders to exploit economies of scale within their plants. High costs of production are reflected in the high crushing charges some companies levy for extracting shea butter on a service basis. Kassardjian, the company with the longest experience of processing and exporting, does not complain about export prices.

Refined shea butter prices: Buyers complain that Ghanaian suppliers of refined shea butter charge too much. The evidence that buyers provide suggests that Ghanaian refined butter is not competitive with butter from Cote d'Ivoire. However, refineries in Cote d'Ivoire have been established for longer than their Ghanaian counterparts and have almost certainly exploited economies of scale.

Lack of access to international markets: Some processors, again those with least experience in the business, find difficulty establishing contact with overseas buyers.

Competition for shea nuts: One exporter feared that competition among processors for shea nuts would drive up procurement costs to the extent that the Ghanaian shea butter processing industry would become internationally uncompetitive.

6. The CPHP Bridge Press

This section reviews the feedback that we received on the CPHP bridge press during our field work in northern Ghana in November 1998.

Some small scale processors hold negative perceptions of the bridge press, particularly because they believe that butter produced by the press contains high levels of moisture, a result, they claim, of the absence of roasting before extraction. Many women also believe that the bridge press technology yields less butter than the traditional method. The source of this opinion may have been the unexpectedly low yield from a recent bridge press technology demonstration workshop in the Northern Region funded by the Friedrich Nauman Foundation. Close sources said that during the workshop, the processors let the ground shea nuts cool for too long after milling. From experience gained during the development of the bridge press, this practice invariably reduces yield. In contrast, women trained by NRI and TAAP have no complaints on the yield of bridge-pressed shea butter.

Kassardjian also believes that the traditional method of processing gives the best shea butter. While agreeing that the quality of the bridge-pressed butter is good, the

company believes the absence of roasting in the process results in a higher moisture content.

Weighing in on the other side of the debate, OLAM, Bosbel, the Shea Butter Company, Johnson Farms Complex and Lever Brothers believe that the quality of shea butter produced by the bridge press is superior to that of the traditionally processed butter.

In a paper delivered at a workshop held in Tamale in September 1997, Peter Donkor from TCC presented experimental evidence that the bridge press produces higher quality butter than the traditional method (refer to tables A1 and A2 in the Appendix). In particular, he concluded that the bridge press produces butter with lower moisture and free fatty acid contents.

During our fieldwork, several contacts expressed the view that the quality of shea nuts determines the quality of the butter. Exporters in Tamale area believe that shea nuts from certain areas like Yendi, and Wale Wale, give higher yields and better quality butter than shea nuts from other areas. These nuts are identified by their smaller size and red colour. They are said to yield shea butter with a free fatty acid content of less than 1%. Shea nuts from Ghana in general were claimed to be of better quality than nuts from other West African countries.

7. Conclusions

This section draws together the findings of the research. The conclusions are:

1. International demand from CBE manufacturers for shea butter is strong. Environmental concerns in developed countries mean that demand for shea butter produced in West Africa is growing, and will probably continue to do so.
2. International demand for shea butter from cosmetics companies is also growing.
3. These conclusions are re-inforced by developments in Ghana, where the leading processors have plans to expand their production.
4. Ghana is in a strong position to take advantage of market growth, especially as it has a natural advantage in the quality of its shea nuts.
5. Development of the industry in Ghana will be held back by poor physical access to shea nut producing areas, and poor butter quality (resulting from poor harvesting practices and poor processing techniques).
6. The benefits that small scale processors receive from market growth will be limited unless processors can access more working capital.
7. Commercial utilisation of shea butter meal (the main by-product from the extraction process) as an animal feed ingredient may increase industry profitability.

8. Over-exploitation of firewood resources threatens household welfare in northern Ghana. The problem could be alleviated by greater use of the CPHP bridge press.
9. Conclusions on the CPHP bridge press: The press seems to produce a higher quality product than the traditional technique. However, the traditional technique yields a butter that meets the specifications required by most buyers, and, with a scarcity of price premia for quality that exceeds minimum specifications, there may be little incentive for small scale processors to use the bridge press. In its favour, the press increases output and, given the prevailing low margins in the industry, may make a crucial difference in terms of enterprise profitability.
10. The CPHP should not become involved in the development of small scale shea butter refining technology. Apart from technical barriers, the market for refined butter is highly specialised. Moreover, there is under-utilised medium scale refining capacity in Ghana. Developing new capacity should only be considered if existing capacity becomes fully utilised.

8. Recommendations For Developmental Assistance And Future Research

This section builds on the research conclusions to suggest appropriate assistance to the Ghanaian shea butter industry. The recommendations are:

1. To implement a pilot project to test the technical and financial performance of traditional vs. bridge press processing.
2. To research the use of shea nut meal in animal feeds. The research would test its suitability, and cost and quality competitiveness.
3. To research shea nut harvesting, handling and storage practices to see if improvements affecting the quality of shea butter can be made.
4. To involve reputable NGOs to bridge the gap of trust between export buyers and small scale processors. This will encourage buyers to advance funds to processors for use as working capital.

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Appendix

Results of TCC's Laboratory Analysis

Table A1: Comparison of Quality Using Different Extraction Techniques				
Process Type	Kernel Treatment	Free Fatty Acid in Oil (%)	Comments	Moisture Content (%)
Press	Raw	1.03	Both bad and good kernels used	0.22
Press	Fried	0.49	Only good kernels used	0.18
Press	Raw	0.44	Only good kernels used	0.20
Mechanised	Fried	1.25	Only good kernels used	0.35
Mechanised	Fried	1.77	Only good kernels used	0.32
Traditional	Fried	1.44	Both bad and good kernels used	0.30

Source: P. Donkor (1997)

Table A2: Comparison of Quality Using Nuts from Different Locations			
Source	Extraction Technology	(%) Moisture Content	(%) Free Fatty acids
Wantugu	Bridge Press	0.17	0.62
Vittin	Bridge Press	0.17	0.79
Kpilo	Bridge Press	0.11	1.64
Yipelegu	Bridge Press	0.22	2.98
Vittin	Traditional	0.81	1.47
	Traditional	0.77	1.40

Source: P. Donkor (1998)