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IMPROVING ENVIRONMENTAL MANAGEMENT IN THE WEST AFRICAN CASHEW PROCESSING SECTOR OPPORTUNITIES AND CHALLENGES

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Photos: First photo caption: *Cashew tree: the perfect intersection of commerce and natural resources.*

All photos in this report taken by Thomas Catterson.



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The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID) or the United States Government.

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ACRONYMS

ACTE	Africa Competitiveness and Trade Expansion Initiative
ACA	African Cashew Alliance
CDI	Cote d'Ivoire
CNSL	Cashew Nut Shell Liquid
ECOWAS	Economic Community of West African States
EMMP	Environmental Mitigation and Monitoring Plan
FTF	Feed the Future
MT	Metric tons
RCN	Raw cashew nuts
SOW	Scope of work
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

The very positive results within the Cashew Value Chain in West Africa in recent years, including expansions in production of raw cashew nut, a growth in installed processing capacity, and increased trade, prompted some concern about the growing waste stream associated with it. The processing industry generates a significant waste stream with 50 to 75 percent of cashew nut shells left over after processing. Waste from cashew nut shells mounts up quickly and most processing plants have found it difficult to dispose of it properly, with growing mounds of waste dumps on-site. The presence of caustic CNSL (cashew nut shell liquid) in the waste slows natural decomposition and can lead to local site contamination and toxic run-off into nearby surface waters.

This dark and oily waste stream has given the cashew industry a slight black eye and prompted growing concern about the environmental implications of cashew processing. Accordingly, and in line with its project-wise Environmental Mitigation and Monitoring Plan (EMMP), the USAID-funded Trade Hub Project commissioned this study of the environmental management of the cashew processing industry. In-depth interviews with industry stakeholders in four countries and seven industries were carried out as part of this study.

The study concluded that although there are indeed certain issues of adverse environmental impacts from cashew processing, none of them are particularly complex issues nor should they be difficult to resolve. The study reaffirms the proposal first mentioned in the EMMP that an environmental sustainability criterion be added to the African Cashew Alliance (ACA) Quality and Sustainability Seal. This criterion is intended as another means to improve the marketability of African cashew in an increasingly globalized market demanding sustainable production. Doing so is seen as another step in expanding West Africa's comparative advantage in producing cashew to one of processing it as well.

The potential adverse impacts noted and the recommended mitigation measures associated with them are as follows:

- **Site Contamination from dumping of cashew nut shell waste**, to be remedied by clustering smaller industries to aggregate the waste stream and allow for cost-effective treatment options, including pressing for CNSL and industrialized energy conversion.
- **Existing and new waste dumps leading to site contamination and off-site run-off**, to be remedied by relocation and reconstruction of a properly designed disposal site which contains run-off and where waste is layered with soil to promote natural decomposition.
- **Localized site contamination from spills during CNSL pressing & processing**, requires more careful handling of CNSL and a containment berm around the processing site within the factory compound.
- **Dark and heavy smoke from boilers leads to localized air pollution** can be avoided to some degree by preferring pressed cake for boiler fuel and/or adding a simple scrubber to the factory smokestacks.
- **Process water from factory steamers contaminates the site and/or adjacent surface waters**, requiring the implementation and operation of a properly sized septic system for process water from cashew steamers.
- **Elevated noise levels in certain areas of the factory**, to be remedied by requiring workers in those areas to wear ear protection, add baffling to suppress noise levels and/or reconfigure

layout of the factory to isolate noisy areas from other workers.

- **Exposure to CNSL to workers hands and possible splash to eyes during de-shelling,** avoided by requiring de-shelling staff to use oil for hand protection or wear rubber gloves, and adding eye wash stations in these areas of the factory.

The report concludes with **a brief Annex of collateral observations about the current micro-economics of the cashew processing industry** in West Africa which emerged in discussions with sector stakeholders. Although this report concludes that meeting the challenges and opportunities of improved environmental management for the processing factories does not need to be a costly affair, the current slim margins and closed factories will need to improve to convince investors to take these next steps towards sustainability. The consultant is convinced that the need for clear sector strategy that can broker the current challenges is a perfect focus for the work of the African Cashew Alliance (ACA) and the support it will receive from the Trade Hub as part of a new MOU.

I. BACKGROUND

USAID/West Africa’s Mission-wide goal is the West-African led advancement of social and economic well-being. This goal is supported by several development objectives, including “broad-based economic growth and resilience advanced through West African partners.” The Trade Hub and African Partners’ Network Project (the “Trade Hub”) will contribute to this development objective by achieving two critical intermediate results:

1. Improving the capacity of West Africa’s farmers and firms in targeted regional and global value chains.
2. Improving the business enabling environment by addressing transport constraints and trade barriers affecting the efficiency of the region’s corridors and borders.

The Trade Hub will work through regional private sector associations and regional governmental entities to help channel all partners’ efforts in a way that will address critical constraints to trade competitiveness, capture opportunities to expand trade, demonstrate West Africa’s productive potential to investors, and facilitate greater investment in the region. Its results will include both an increase in 1) regional trade in key agricultural commodities, a critical Feed the Future (FTF) indicator, and in 2) value-added global exports, a targeted indicator for the Africa Competitiveness and Trade Expansion (ACTE) Initiative, which ultimately aims to increase Africa’s share of world trade.

2. THE CASHEW VALUE CHAIN

The Cashew Value Chain Assessment Report (May 2014) concluded at the time that the cashew value chain is a particularly large, export-oriented sector. Cashew is grown in 9 of the 15 member countries of ECOWAS, and represents 35 to 40 percent of the world production of cashews, with Cote d'Ivoire being among the largest producers in the world (see World Production Figures in Table below). There is ample reason to believe that West Africa has a comparative advantage in producing (growing) cashew nut. It is worth noting that cashew is a tree crop well-suited to the variables of weather in Sudano-Sahelian environment in which it is planted, thus affording a degree of resilience that many other crops do not offer. West African production has expanded considerably in the last two decades; the historical data given on the ACA Website (<http://www.africancashewalliance.com/en>) shows totals from 2000 at 395,900 MT, to 635,400 MT in 2005 to a total of 1,137,400 MT in 2012.

Although about 90 percent of West Africa's total production is exported as raw cashew nuts (RCN), there are increasing opportunities and investments in expanding local value-addition processing, with current processing capacity at around 120,000 MT's of kernels, and new investments in Ghana and the Ivory Coast. This growing installed capacity to process cashew, from raw nuts to cashew kernels, is providing ample job opportunities, as many as 12,000 jobs within the region, 90% of which go to women working on the factory floor. The new investments in processing bring potential negative environmental impact with the management of the waste stream (nut shells). Expanding the comparative advantage present in cashew production to the processing stage will be predicated on sound environmental management of the waste stream.

2.1 TRADE HUB FY2015 OBJECTIVE AND STRATEGIES FOR THE CASHEW VALUE CHAIN

2.1.1 OBJECTIVE

The Trade Hub will assist the regional private sector alliance (ACA - African Cashew Alliance) to promote increased local processing of cashew nuts and an overall increase in raw and semi-processed nut exports by its member companies.

2.1.2 FY2015 STRATEGY UNDER THE CONTEXT OF THIS CONSULTANCY

Contribute to on-going efforts to improve cashew productivity and a more environmentally-friendly production system.

2.2 METHODOLOGY FOR THIS CONSULTANCY

In keeping with the premise of serving the value chain and its stakeholders, this consultancy was carried out through on-site consultation with factory managers and personnel in three countries of the Region: Cote d'Ivoire, Burkina Faso and Ghana. Please see **Annex A** which includes the Scope of Work for this Consultancy and **Annex B** which provides a list of the factories visited and the sector personnel interviewed. Seven working factories were visited with in-depth tours carried out in each of them; more factories would have been visited except that a number of processing facilities were shut down due to high raw material prices (see **Annex C** for a discussion of these matters).

In addition, a range of other stakeholders, including off-site factory managers and the personnel of the African Cashew Alliance and the African Cashew Initiative were interviewed as part of data and information collection efforts. Early-on, a working draft of a simple “issues list” was compiled and it served as a checklist for ensuring that each plant visit was well analyzed. The list also served to generate feedback online from other informants with whom it was shared.

As per the SOW for the consultancy specified, a Power Point presentation with the preliminary findings of the consultancy was prepared and served as the basis for the discussions during an out-briefing session with both USAID and ACA personnel and as a prelude to this Report.

Getting the Terminology Right: One often encounters confusion when perusing cashew sector literature from West Africa (and elsewhere). The following terms need to be more consistently used if sector statistics are to improve and provide the sound basis for sector planning, to wit:

Nut in Shell—the raw nut as it comes off the tree and has been separated from the cashew apple.

Raw Cashew Nut—same as “nut in shell”, the harvested nut with its shells still intact.

Kernel: the raw cashew kernel with the shell and testa (skin) removed without further processing, such as roasting and salting.

Shell Waste: the shells removed from the kernel, also known in French as “coque de cajou.”

CNSL: Cashew Nut Shell Liquid...the oily liquid pressed from the shell waste.

Pressed Cake: the remains of the cashew nut shell waste that has been pressed to remove the CNSL, or in French, “pate de coque de cajou”.

Installed Processing Capacity: the capacity for raw material input that will be converted to kernels, typically expressed in metric tons per year.

Figure 1. Cashew nut processing factory—employment opportunities for women



Table 1. Cashew production and processing estimates world-wide

Region Country	2012 production (thousand metric tons)	Cashew processing		
		No. of factories	Processing capacity (Mt)	Processing capacity (%)
Asia				
Cambodia	67	4	9,000	13%
India	670	>2500	1,270,000	190%
Indonesia	83	7	11,000	13%
Malaysia				
Philippines	11	<5	2,600	24%

Sri Lanka	8	<5	6,700	84%
Thailand	6	0	-	0%
Vietnam	345	>500	980,000	284%
Others	6	>20	20,000	333%
Sub Total	1 196	3041	2,299,300	192%
West Africa				
Benin	116	6	8,300	7%
Ghana	32	6	13,500	42%
G. Bissau	155	5	2,300	1%
Ivory Coast	450	8	36,000	8%
Burkina	25	6	5,600	22%
Nigeria	95	7	32,000	34%
Senegal	30	1	1,400	5%
Togo	6	2	4,600	77%
Gambia	8	2	5,000	63%
Others, Guinea	10	1	2,500	25%
Sub Total	927	44	111,200	12%
Eastern and Southern Africa				
Kenya	10	4	9,500	95%
Madagascar	7	2	2,000	29%
Mozambique	85	18	28,000	33%
Tanzania	120	5	18,000	15%
Sub Total	222	29	57,500	26%
Latin America				
Brazil	210	16	220,000	105%

Peru	3	2	2,000	67%
Others	5	2	3,500	70%
Sub Total	218	20	225,500	103%
Total Production	2563	3134	2,693,500	105%

Source: Cashew Baseline Information Online- Shakti Pal, Technoserve, Côte d'Ivoire

2.2.1 ADDING AN ENVIRONMENTAL MANAGEMENT DIMENSION

In August of 2014, the Trade Hub project prepared an Environmental Mitigation and Monitoring Plan (EMMP) as part of its compliance with USAID's environmental procedures (22CFR216) and reflecting the fact that a number of its activities were accorded a Threshold Determination under the program level IEE of "Negative with Conditions." The following is an excerpt from the EMMP as applied to the Global Value Chain for Cashew:

COMPONENT – SUPPORT TO GLOBAL VALUE CHAINS -- CASHEW

General Conditionality

Technical assistance and/or capacity building activities directed at partner organizations or commodity platforms involved in these major food-oriented export crops (Cashews, Mango and Shea Nuts) will follow the sectoral guidance prepared and recommended by USAID in the recently updated Sector Guidelines published by the USAID Global Environmental Management Support Program (GEMS) and especially on agriculture (http://www.usaidgems.org/Documents/SectorGuidelines/SectorEnvironmentalGuidelines_Agriculture_2014.pdf). **Furthermore**, in keeping with the sustainability focus implicit in this EMMP, the technical assistance and capacity building activities for these value chains will also be expected to introduce where possible, many important plant modernization concepts aimed at achieving a more "clean technology" based approach. These may include techniques involving food safety, sanitation, energy conservation, rational use of water resources, rationalized raw materials supply and use, lower levels of solid waste and appropriate recycling, and reductions in effluent generation and sustainable treatment options such as off-grid bio-energy technologies, all of which are seen as cost containment measures essential to the competitiveness of the West African industry in an increasingly globalized marketplace. The GEMS Program has specialized environmental guidelines, along these lines, titled: "Resource Efficient and Cleaner Production Briefing and Resource Guide For Micro & Small Enterprises" (http://www.usaidgems.org/Documents/MSEs/USAID_MSE_Sector_Guideline_Food_Processing_2013.pdf). In addition, the Trade Hub efforts to build capacity among commodity platform organizations will include specific advice and counsel on the importance of recognizing the challenges inherent in pesticide use. The USAID GEMS project briefing presentation on "Pests, Pesticide Risks and USAID's Response" (http://www.usaidgems.org/Documents/complianceTopics/ST_Pesticides_Safer_UseCompliance_Cairo_10Oct2012.pdf) can be generally incorporated into technical assistance and training materials for global value chain partners in the Region.

Sub-Component	Cashew
Activity Stream	"Support an environmental examination of cashew production" Support the implementation of a study by the African Cashew Alliance (ACA) to further develop best management practices related to increased productivity and also for the management of the waste stream (nut shells and possibly unused cashew fruit) to avoid adverse impacts.

Activity Stream	<p>“Capacity building for cashew processing plant personnel”</p> <p>The Trade Hub will support the ACA to develop and bring online a training program for skilled workers and plant floor managers. This training course will incorporate the findings of the above mentioned study on the best management practices for sustainable cashew production.</p>
Activity Stream	<p>“Access to financial services and resources”</p> <p>The Trade Hub will support the ACA to train West African Business Service Providers (BSPs) or Finance Advisors (FAs) so that they are more capable of assisting the cashew processing and export ready industry to obtain short, medium and long-term financing through the development of business management plans, financial statements and loan applications. This training will include a standardized procedure for environmental oversight and the use of a common template in support of loan applications.</p>

Activity	Possible Adverse Impact	Proposed Mitigation Measures	Monitoring Indicators	Monitoring / Reporting Frequency	Responsible Parties	Observations and/or Verification Checklist
Increased trade in cashew leads to a larger waste stream from nut processing.	Potential for land degradation and even contamination of surface and ground waters and occupational health and safety related issues.	Trade Hub Project is supporting the ACA on the environmental study of cashew production with special emphasis on management of a potentially toxic waste stream of cashew shells with toxic oils which will include, inter alia, specific recommendations about the mitigation measures to deal with these wastes.	Successful development of sustainable cashew production and processing guidelines, and their application among the partners network	One time event, at the submission of the Report of the Sustainable Cashew Production Study	Cashew Value Chain Specialist	The guidance resulting from this study will be used as part of the training, both for industry management personnel, and further incorporated into the environmental oversight procedure (e.g., ESF) training for BSPs being prepared to better provide assistance to cashew processors & exporters (see below)
Increased trade in cashew products leads to more construction of agro-processing facilities	Accumulating plant and processing waste leads to land contamination, poor phytosanitary conditions and possible	Sound plant design which incorporates the protocol for cashew nut waste developed above, and applies it following the guidelines for	Submission, review and approval of an ESF associated with a request for loan resources.	Technical assistance reports will be prepared and all such technical assistance activities regularly tracked.	Cashew Value Chain Specialist	Participants in the Trade Hub Partners Network, tapping financial resources for developing new processing

	pollution of surface waters and ground waters.	sustainable small-scale agro-industry construction. These guidelines include special attention to: a pre-construction site survey to determine if the site is near a surface water body, involves forested land or wetlands, has a slope greater than 15 degrees, past use, and whether there is any likelihood of off-site impacts as a result of construction activities.				facilities will also present an ESF and where indicated, build their facilities following the USAID Guidelines on Small-Scale Construction and for use in the field, the USAID Africa Bureau's Environmental Compliance and Management Support (ENCAP) Visual Field Guide for Construction.
An expanding cashew industry runs up against known shortages of experienced and trained factory management staff and will thus have difficulty ensuring well-run cashew processing plants.	Effective and efficient production will be synonymous with sustainable production or the risk of localized pollution and site contamination rises.	The outcome of the environmental management study for Cashew will be part of the training courses for both cashew plant managers and BDS personnel servicing the industry.	Number of participants in cashew production training courses that include an environmental management module	Each training course will prepare the usual USAID Training report which provides basic data about the event.	Trade Hub Capacity Building and Training Specialist with the Cashew Value Chain Specialist	

2.2.1.1 African Cashew Alliance (ACA)

The current study is expected to lay the ground work for a consideration of improved environmental management for the cashew processing sector as a further step towards enhancing its ability to compete

in an increasingly globalized marketplace. The current primary USAID/Trade Hub partner for this value chain, the African Cashew Alliance, has a certification process—the **ACA Quality and Sustainability Seal**—which includes 14 specific food safety/quality areas, including infestation, foreign material, clumping/blocking, taste, and grade compliance. It also includes global social compliance standards: absence of child/prison labor, absence of abuse or harassment, and fair employee wages, as well as local labor laws.

The expectation is that this study on improved environmental management for the cashew processing industry will provide the basis for adding other criteria related to environmental management to the ACA certification process. Industries which receive the ACA Quality and Sustainability Seal should find it easier to attract buyers in a globalized marketplace which is increasingly focused on and demanding about the environmental basis for food production.

2.2.1.2 Environmental Management— Part of the Cost of Doing Business

The present issues surrounding raw material supply and its rising cost and consequent closings of local processing capability (see **Annex A** below for some commentary on the State of the Value Chain as observed during this consultancy) underscore the need for the industry to come to grips with its cost structure. In recent years, when local processing capacity was expanding, the inherent profitability of the value chain suggested an easy sell for environmental management—getting the “green seal” of approval as another marketing option for the West African cashew industry.

In the last two years or so, the cashew sector has been experiencing a “boom” in demand for its products which has prompted the establishment of new processing facilities. And because these new processing plants always had the outlet of potential export of raw cashew nut, it was not difficult to turn a profit and hence there was little pressure for fine-tuning facilities for effectiveness and efficiency.

The current issues have altered the playing field, at least temporarily, and there is more wariness about further investment and ensuring a better “bottom line”, something neither surprising nor inappropriate. The contention, however, despite some temporary setbacks, remains the same. West Africa has a comparative advantage because of soils and climate for growing cashews. The development needs of the region...more good jobs...demand an effort to transform the value chain and its nascent industry into another comparative advantage of processing cashew for value-added products for trade and export. This thrust, for effectiveness and efficiency in the West African cashew sector, being promoted by ACA and the Trade Hub Project, is predicated on increasing entrepreneurial skills, better understanding of industry cost structures and accordingly, an ability to make wiser investment choices, in general and in this particular case, as concerns environmental management.

Cashew Nut Shell Waste— understanding the magnitude of the waste stream...

- Ratio of shell to kernel is about 3 to 1, after extracting the cashew kernel, 75% of the original weight of the raw material remains
- Some cashew nut shell waste is consumed to fuel boilers which provide energy for steaming and for drying product, limited to about 10%, thus about 64% of original remains
- Cashew Nut Shell Waste can also be pressed to produce Cashew Nut Shell Liquid (CNSL), reducing the mass another 20%
- Leaving 50% of the original as pressed shell waste

ONE TON IN/HALF-TON OUT!!!

2.2.1.3 *Being Proactive about Waste Management*

Lest there be any confusion, promoting environmental management is not being touted, at least not yet, as the path to premium prices for export cashew nuts. It will be some time before the global marketplace for cashew settles down and a bonafide quality producer, based in West Africa may be able to claim a premium price for value-added products. That being said, and as will be explained below in greater detail, better and cleaner management of the processing facilities can lead to cost savings and/or avoiding higher permitting costs or unfortunate rent-seeking behavior because of exposure as an industrial polluter.

2.3 POTENTIAL ADVERSE IMPACTS OF CASHEW NUT PROCESSING

There are a number of likely adverse impacts that result from the establishment and operation of a cashew nut processing facility.

2.3.1 CASHEW NUT SHELL WASTE—A GROWING WASTE STREAM

However, clearly, as mentioned above, the best known of these negative impacts is that of the cashew nut shell waste stream. One of the things that makes this waste stream an issue is its inherent high volume. The text box at the right above discusses the outcome of a typical processing facility-- 50 % of the raw material is generated as waste. It is very clear that the industry has something of a negative reputation as related to the management, or better said, failure to manage, its principal waste stream...the large mounds of oily, black shell waste currently found around many of the factory sites across the Region.

Figure 2. Cashew nut shell waste



To-date, there have been few options for the proper disposal of cashew nut shell waste in the towns and cities where these industries are located, no proper landfills or organized solid waste disposal sites that might have absorbed this waste stream. As mentioned, more often than not, these wastes have been dumped somewhere on the factory plot where decomposition has been slow and spontaneous combustion or otherwise has served to reduce the accumulated mass.

Figure 3. Cashew nut shell waste dump, in this case contaminated with other solid waste



In actuality, these large mounds of strictly organic waste do not constitute a major environmental risk or adverse impact except where, because of the lay of the land, rainwater draining through them generates a dark and oily stream of effluent which can flow into adjacent surface waters and badly pollute them. Had these wastes been dumped in a large excavated pit and thus contained, they would gradually decompose. This need to contain the waste dump and avoid streaming outflows contaminating local surface waters takes on more importance where these factories are located in semi-urban settings.

Figure 4. Dark smoke from the stack of the plant boiler



2.3.2 LOCALIZED AIR POLLUTION FROM FACTORY BOILERS

All the plants visited, operating or otherwise, use a boiler system to generate hot water for steaming the nuts during initial processing and for heating the kilns and ovens to dry the products. These systems are typically fueled using cashew nut shell waste which when burned in these unsophisticated boilers generates a dark and heavy smoke. In at least one instance, the factory managers reported that local authorities had complained about air pollution from this source.

In addition to the smoke contamination, it has been reported that using raw shell waste causes higher levels of deterioration to the boiler and its components, because of the caustic nature of the fuel and

the resulting smoke. It has been estimated that this equipment last half as long as similar equipment fired with a cleaner burning fuel such as pressed cake. This impacts any type of investment decision as the expected useful life is significantly reduced.

2.3.3 PROCESSING EFFLUENTS—ROASTED VERSUS STEAMED NUTS

Closely related to the above issue, all of the factories visited steam their raw nuts as a prelude to shelling them rather than roasting them. The roasting process generates more smoke, hard to control because of the nature of the machinery involved, and requires a spray bath at the end of the roasting. This spray bath washes water and CNSL off the nuts which must then be contained and treated.

The steaming approach most common in West African cashew processing plants does not generate CNSL run-off but does leave a quantity of water from the steam bath which is slightly contaminated with oils and waxes. This leftover process water must be properly managed, ideally through a well-constructed and easily accessible septic system with dual chambers, a clean-out hatch and a properly laid-out drainage field.

2.3.4 OCCUPATIONAL SAFETY AND HEALTH ISSUES

The internal environment for plant employees and workers varies greatly across the range of cashew processing facilities visited during this consultancy. **High noise levels**, particularly for workers involved in or working in proximity to mechanical de-shelling machines is an issue in many if not all plants. The grading machines which tumble raw nuts in a steel cylinder or combination of sieves are also quite noisy, and constitute a significant danger for hearing loss over time.

Another important occupation safety issue is **exposure to the caustic liquids** (CNSL) contained in the raw nuts during de-shelling. Most factories in West Africa provide a castor oil dip for the fingers of the women doing the de-shelling which seems to work well. Others employ rubber finger protection. Because of the nature of the operation, there is some concern that these caustic liquids could splash up into the eyes of the workers. Improved personal protective equipment, including light-weight rubber gloves, aprons and face shields could better protect these workers.

Some of the **factories are modern, bright and airy** but these are the exceptions rather than the rule. Improving these facilities should go hand-in-hand with food safety and sanitation measures and will make for a more pleasant working environment and facilitate clean handling of food stuffs. Satisfied and competent employees who feel their welfare is being taken into account are critical to the sustainability of any enterprise. Processing cashew nuts is an industry based on a permanent crop tree that will continue to produce nuts for decades to come and for which there is a growing world-wide market—the long-term view will prevail and bring benefits for all involved.

2.3.5 CNSL PRESSING PROCESS AND SITE CONTAMINATION

The current technology for pressing cashew nut shell waste to extract CNSL and further processing it has been noted to be a dangerous and dirty work site even within the best of factories. This is due to the rudimentary screw presses used, the heavy, viscous oil that results and the de-sedimentation and heating processes which follow. Handling the sludge from the de-sedimentation process has not been well organized and in a number of instances seen, has led to unfortunate dump site. Also, the hot CNSL is difficult to handle and has been the subject of a number of spills on the site where it is being pressed and treated.

Figure 5. Sludge from de-sedimentation tank has been dumped on-site



Table 2. Mitigation and monitoring—best practices for the cashew processing sector

Issue/Adverse Impact	Recommended Mitigation Measures	Monitoring Responsibilities & Frequency
Waste Stream Related Measures		
<p>Site Contamination from dumping of cashew nut shell waste</p>	<p>Consider Clustering the small industries—so as to be able to aggregate the waste stream and find cost effective treatment options, including pressing for CNSL & energy conversion options</p>	<p>Annual on-site monitoring, as part of the ACA Seal Certification Audits</p>
<p>Existing Waste Dumps leading to site contamination and</p>	<p>Manage existing accumulated shell waste by relocating the</p>	<p>Annual on-site monitoring, as part of the ACA Seal</p>

off-site run-off	dump site and creating a properly constructed disposal site which prevents run-off . Excavate the site, save the excavated soil and transfer accumulated shell waste, depositing it in layers (nre 50 cm thick) and overlay with soil (+/- 20 cm). Ensure run-off from the site is contained, within a berm and sump system if necessary.	Certification Audits
New Cashew Nut Shell waste disposal...	Aggregated industry, within a certain transport radius, presses shell waste for CNSL and uses pressed cake for energy generation & industrial charcoal production... disposal limited to pressed cake , added to the designated disposal site as per above recommendations.	Designated factory environmental manager ensures regular monitoring of proper disposal methods.... Annual on-site monitoring, as part of the ACA Seal Certification Audits
Accumulating pressed shell waste —a lost resource opportunity	Use pressed cake for fuel options , at the plant boiler and at the aggregation plant to generate energy, through pyrolysis, biogas or co-generation options.	
CNSL Pressing Activities		
Localized site contamination from spills during CNSL pressing & processing	More careful handling of CNSL, particularly hot CNSL being de-carbolyzed so as to avoid spills; add a containment berm around the CNSL processing facility on the factory site.	Designated factory environmental manager ensures regular monitoring of proper disposal methods.... Annual on-site monitoring, as part of the ACA Seal Certification Audits
Sedimentation sludge and site contamination...	Establish a safe & effective protocol to remove and transport sludge from the de-sedimentation tank for CNSL to be added to the disposal site.	Designated factory environmental manager ensures regular monitoring of proper disposal methods.... Annual on-site monitoring, as part of the ACA Seal Certification Audits

Localized Air & Water Pollution from the Factory

Dark & heavy smoke from boilers leads to localized air pollution...	Preference for burning pressed shell waste as fuel for factory boilers; adding simple scrubber if continuing use of cashew nut shell waste.	Designated factory environmental manager ensures regular monitoring of proper disposal methods....
Process water from factory steamers contaminates the site and/or adjacent surface waters...	Build and operate a properly sized septic system with leach field to use to drain off water from cashew nut steamers.	Designated factory environmental manager ensures regular monitoring of proper disposal methods....

Occupational Safety and Health Related Concerns

Elevated noise levels in certain areas of the factory...grading area & mechanical shelling area...	Require workers in those areas to wear ear protection , add baffling to suppress noise levels and/or reconfigure layout of the factory to isolate noisy areas from other workers.	Designated factory environmental manager ensures regular monitoring of noise levels...
Exposure to CNSL to workers hands and possible splash to eyes during de-shelling...	Women de-shellers use oil to protect hands and/or light weight rubber gloves; install eye wash stations in de-shelling area.	Designated factory environmental manager ensures regular monitoring of the proper use of personnel protection equipment and proper functioning of eye wash stations...

2.4 A STRATEGY FOR ROLLING-OUT BEST PRACTICES IN ENVIRONMENTAL MANAGEMENT

As noted above, one of the basic premises of this consultancy was to find a way to add an environmental management dimension to the current efforts to enhance local processing capacity for the cashew industry in West Africa. There was general agreement with the African Cashew Alliance to consider how to include environmental management as another criterion for the current ACA Quality and Sustainability Seal.

Doing so, however, must be addressed in the 'bigger picture' context of the present efforts at ACA to find a new Managing Director and reconstitute and strengthen the organization's program. Then too, the Trade Hub should review the existing MOU with ACA to further their common goals which given the circumstances should probably await the confirmation of a new leader for the organization. Doing

so would provide the Trade Hub with an opportunity for in-depth discussions of the way forward in terms of strengthening this partnership and ensuring that it better contributes to the long-term needs of the cashew sector in West Africa.

As this consultant has noted elsewhere, given the current micro-economic challenges to the cashew sector in West Africa, it is the perfect opportunity to reconsider the mandate and priority role of the ACA which has benefitted from USAID support for almost a decade. The organization is very well suited for brokering the sector-wide understandings that will underpin the future development of the Cashew Industry in West Africa and find the common ground that will enable it to continue to prosper in the coming years. This consultant would suggest **a series of priority actions by ACA** as the new leadership takes over, including the following:

- A concerted effort to improve the database and developing the analytical skills and that will ensure a sound basis for sector policy and strategy.
- Develop a reference list of “peer reviewed” articles about the cashew industry and post them on their website.
- Put together a “white paper” on the development options for the cashew sector including both producers and processing industries in West Africa.
- Participate in and/or lead a lobbying effort with national governments of the Region about free trade in the sector.
- Offer a training course on entrepreneurial skills for cashew processing industry personnel, with specific reference to building the analytical skills required to understand industry cost sector issues including the cost implications to adding improved environmental management.

ANNEX A: SCOPE OF WORK FOR THIS CONSULTANCY

Terms of Reference
Trade Hub Network Project
Improved Environmental Management of Local Cashew Processing

Draft Date: 05/06/15

OVERVIEW OF THE PROJECT

USAID/West Africa’s Mission-wide goal is the West-African led advancement of social and economic well-being. This goal is supported by several development objectives, including “broad-based economic growth and resilience advanced through West African partners.” The Trade Hub and African Partners’ Network Project (the “Trade Hub”) will contribute to this development objective by achieving two critical intermediate results:

1. Improving the capacity of West Africa’s farmers and firms in targeted regional and global value chains.
2. Improving the business enabling environment by addressing transport constraints and trade barriers affecting the efficiency of the region’s corridors and borders.

The Trade Hub will work through regional private sector associations and regional governmental entities to help channel all partners’ efforts in a way that will address critical constraints to trade competitiveness, capture opportunities to expand trade, demonstrate West Africa’s productive potential to investors, and facilitate greater investment in the region. Its results will include both an increase in 1) regional trade in key agricultural commodities, a critical Feed the Future (FTF) indicator, and in 2) value-added global exports, a targeted indicator for the Africa Competitiveness and Trade Expansion (ACTE) Initiative, which ultimately aims to increase Africa’s share of world trade.

The project will build the capacity of several key groups of African partners—regional private sector associations and alliances, the Economic Community of West African States (ECOWAS), the Economic and Monetary Union of West Africa (UEMOA), a multi-donor funded Transport and Facilitation Observatory, and Global Development Alliances with private sector companies. As the Trade Hub works with associations and regional alliances, it will help them serve as leaders in promoting reforms, attracting buyers and investors, and adopting improved practices. Eventually, the Trade Hub’s partners will act independently and take on even greater leadership roles.

The Trade Hub’s major components are:

- Regional staple foods development (livestock and grains)
- Global value chain development (targeted agro-processing and manufactured consumer goods)
- Finance and investment
- Transport and the trade enabling environment

- Capacity building
- Communications
- Administration and management, including grants administration

CONTEXT FOR THIS ASSIGNMENT

The Cashew Value Chain assessment concluded that the cashew value chain is a particularly large, export-oriented sector. Cashew is grown in 9 of the 15 member countries of ECOWAS, and represents 35 to 40 percent of the world production of cashews, with Cote d'Ivoire being the second-largest RCN producer in the world (after India). Although about 90 percent of West Africa's total production is exported as raw cashew nuts (RCN), there are increasing opportunities for local value-addition processing, with current processing capacity at around 120,000 MT's of kernels, and new investments in Ghana. The new investments in processing bring potential negative environmental impact with the management of the waste stream (nut shells).

Presented below is the Trade Hub FY 15 Objective and strategies for the Cashew Value Chain:

OBJECTIVE

The Trade Hub will assist the regional private sector alliance (ACA - African Cashew Alliance) to promote increased local processing of cashew nuts and an overall increase in raw and semi-processed nut exports by its member companies.

FY2015 STRATEGY UNDER THE CONTEXT OF THIS CONSULTANCY

Strategy #1

Contribute to on-going efforts to improve cashew productivity and a more environmentally-friendly production system.

This assignment will be carried out as an STTA by an environmental consultant who will work closely with Global Value Chain Coordinator, based at the Trade Hub project office in Dakar, the Value Chain Lead, and the Capacity Building Lead, based at the Trade Hub project office in Accra, to implement planned tasks that reflect the strategy described above in the cashew value chain.

The environmental consultant will perform activities in support of the work plan for the Cashew value chain. This activity will complement a similar environmental study that the African Development Bank is supporting for ACA in other parts of the African continent.

Tasks

This assignment will follow recommended activities within the Trade Hub Environmental Monitoring and Mitigation Plan (EMMP) for the cashew value chain. The activities included will also reflect and support the African Cashew Alliance's objective to increase local processing of raw nuts within the African continent.

Under the guidance of the Global Value Chains Coordinator and the Value Chain Component Lead, the consultant will complete the following tasks:

- An analysis of the potential environmental impacts (e.g. increased waste stream) from the

establishment of a local processing facility. This analysis will determine the average waste stream that has been created for those processing facilities created during the previous year.

- Processing facilities will be visited in Senegal, Cote d'Ivoire, and Burkina Faso. Several of these (especially in Senegal) are predominantly women-managed initiatives. Several days will be spent in Ghana for write up and presentation of preliminary findings to USAID/WA.
- This review will identify areas where existing management of these facilities can be improved to 1) reduce the waste stream and better mitigate the negative impacts, and 2) increase efficiency in cashew processing.
- Develop a manual of best practices related to local processing facilities of raw cashew nut to be provided by ACA to its members that are starting such enterprises in the medium term.
- Working with the Trade Hub's Capacity Building team and ACA, develop a roll out strategy for personnel of existing and new processing facilities to receive training and technical assistance to incorporate these best practices (the follow on TA and training are part of the Trade Hub FY 15 work plan).

Expected Results or Deliverables

1. A final report that includes an analysis of the existing waste stream in selected processing facilities that have been created during the previous year. This includes the identification of common negative environmental impacts. Recommendations will be made about specific areas that can be improved in the immediate terms.
2. A manual of best practices for local processing facilities of raw cashew nut to be established in the immediate term.
3. A roll out strategy for ACA with Trade Hub support to disseminate these best practices among its member companies, especially those managing existing and new processing facilities.
4. A power point presentation of key findings and recommendations to be given to the USAID/WA mission prior to departing Ghana.

Methodology

The consultant will review the following documents:

- Trade Hub FY 15 work plan, EMMP and value chain assessment for cashew.
- ACA's current strategy and other internal documents related to local processing efforts

Key informant interviews will be held with:

- ACA senior management
- Selected managers of existing processing facilities
- Trade Hub staff from the value chain and capacity building components

Schedule and Level of Effort

This assignment will take place during May 25 – June 30, 2015 for a total of 30 billable days. The following schedule will be confirmed prior to finalization of the consultant's agreement.

Task & Proposed Dates	Location	LOE
Document Review May 25 -26	Base	2 days
First Phase field work May 27 – June 3	Senegal	6 days
Second Phase field work June 4 – June 11	CDI	7 days
Final phase field work June 12 – June 18	Burkina Faso	6 days
Prepare initial findings & PP for USAID June 19 – June 25	Ghana	6 days
Final deliverable write up June 27 – June 30	Base	3 days
Total		30 days

Reporting Relationships and Support to Be Provided

The environmental consultant will report to the Global Value Chains Coordinator and the Value Chain Component Leader during the assignment. This will include regular meetings as required during the field work.

The consultant will be supported by the Global VC Specialist during the Senegal field work phase and by the Trade Hub office and ATRC in Ouagadougou during the Burkina Faso field work.

ACA will provide contacts for specific member companies involved in raw nut processing in the three countries to be visited and specific support during the Cote d'Ivoire field work phase.

The consultant will be given office space at the Trade Hub offices in Ghana for the final phase of the field work.

The Trade Hub will organize rental cars in all three countries for the consultant's travel in country as necessary.

Travel and per diem support from the consultant's base to the four countries will be provided by the Trade Hub (including hotel reservations).

ANNEX B: PEOPLE AND/OR FACTORIES VISITED AS PART OF THIS CONSULTANCY

Name	Details
Cote d'Ivoire	
Euloge Camara	APEX-CI, AGOA Representative, Abidjan
Gerard Amangoua	APEX-CI, Directeur General Adjoint, Marketing, Communication, Developpement et Relations Exterieures, Abidjan
Marie-Pascale Aka	APEX-CI, Directrice des Partenariats Strategiques
Nessemon Fulbert	Directeur, Sobery Cashew Factory, Bouake
Shalley Sodhi	Plant Manager, Olam Ivoire S.A., Bouake
Diomande Daouda	Sustainable Procurement Head, Olam Ivoire S.A., Bouake
Hussain Gilani	Responsible Exploitation, CASA Agro-Industrie, Bouake
Parfait Yrou	Directeur General Adjoint, SITA S.A., Abidjan
Roger Brou	Managing Director Emeritus, African Cashew Alliance, Abidjan
Rebecca Levy	Economic Growth Officer, USAID, Abidjan
Burkina Faso	
Kokou Zotoglo	Staple Crops Specialist, Trade Hub Project, Ouagadougou
Mamadou Ouattara	Chef du Service Promotion des Exchanges Commerciaux, Chambre de Commerce et d'Industrie du Burkina Faso, Ouagadougou
Patrice Beaujault	Chef de Composante Bien-Etre Economique Durable, USAID/REGIS-ER, Ouagadougou
Harm Voortman	Managing Director, Anatrans, Bobo Dioulasso
Mme Kone Minata	Directrice Generale, SOTRIA-B, Banfora
Berni Goldblat	Coordinateur Adjoint, CINOMADE, Bobo-Dioulasso

Mary	African Cashew Initiative, Ouagadougou
Mamadou Werme	Project Officer, African Cashew Alliance, Ouagadougou
Ghana	
Joseph Yeung	Managing Director, Mim Cashew, Mim, Brong Ahafo
Judith Odei	Quality Assurance Manager, Mim Cashew, Mim, Brong Ahafo
Jemima Akusika Hansen	Human Resources Manager, Mim Cashew, Mim, Brong Ahafo
Akwasi Adom-Dankwa	Finance Manager, African Cashew Alliance, Accra
Sunil Dahiya	Business Advisory Manager, African Cashew Alliance, Accra
Dorcas Doreen Amoh	ACA Seal Coordinator, African Cashew Alliance, Accra
Miriam Gyami	Project Coordinator, African Cashew Alliance, Accra
Jody Stallings	Regional Environment Advisor, USAID/West Africa, Accra
Cecily David	USAID Trade Officer, USAID/Washington
Patrick Nugawela	Senior Value Chain Advisor, Trade Hub, Accra
Jean Francois Guay	Finance & Investment Specialist, Trade Hub, Accra
Malick Lompo	Senior Market Information System Specialist, Trade Hub, Accra
Isatou Jack	Senior Capacity Building and Training Specialist, Trade Hub, Accra
Abou Fall	Global Value Chain Advisor, Trade Hub, Accra & Dakar
Bill Noble	Value Chain Team Leader, Trade Hub, Accra
Jeffrey Povolny	Chief of Party, Trade Hub, Accra

ANNEX C: BRIEF OBSERVATIONS ON THE CASHEW INDUSTRY IN WEST AFRICA

This consultancy was focused on the needs and opportunities for environmental management in the cashew processing sector, based on the supposition that a growing industry was generating a larger waste stream. As it turned out, the reality of the current situation of the cashew sector in West Africa was quite different. At the request of the Trade Hub value chain leaders, a series of brief comments on what was observed albeit beyond the scope of this consultancy, are included here below:

- **High Raw Material Prices**—During the buying season, prices for raw cashew nut in shell rose considerably, as much as 160% (Ghana 4 Cedis per kg or FCFA 500+ per kg). Many informants indicated a difficulty in both acquiring raw material at this price and unwillingness to attempt to process it because of perceptions that smaller plants would not be able to generate positive returns. While the larger operators continued to process cashew, a number of smaller plants, particularly in Ghana but also in Burkina Faso, ceased operations for the current season.

This caused a great deal of consternation in the sector, focused on the premise that outside buyers were trying to stifle the expansion of the local processing capability (which is the stated goal of the Governments of the Region and the Trade Hub & ACA). Several factors are at play here. According to those buying the raw cashew nut, there were indeed many foreign buyers in the Region because of a perceived shortfall in production in India due to too much rain during the flowering season there. This increased demand apparently fed upon itself and pushed prices higher. Supply and demand to the export trade in raw cashew nuts is in the hands of speculators who, with money in hand, were able to participate in the market, as they have done for decades, and respond to this increased demand and perceptions of increased demand. Small local industries trying to get started but were typically strapped for cash with which to purchase raw material. The banks which are financing the expansion of the industry will loan money for plant establishment but not for raw material purchase.

- **Cote d'Ivoire Prohibits Cross Border Trade in Raw Cashew Nut**—Another factor which exacerbated the raw material price situation was the closure by the Government of Cote d'Ivoire of cross border trade in raw cashew nut. The Government did so with the hope of promoting further development of cashew processing capacity in-country against the backdrop of very high production figures (see discussion below). Eleven of the 12 cashew processing industries in Brong Ahafo area of Ghana, and at least one such industry in Burkina Faso, all adjacent to the borders with CDI and long dependent on raw material flows from that country, were forced to close. Two of the newer industries in Bouake, CDI also reported difficulties in acquiring raw material although it was not clear if they were concerned about pricing or about supply.

It would appear that although the Government of CDI set this precedent (and in direct contradiction to the Free Trade Agreements to which it was a signatory under ECOWAS) as a means of promoting more local processing of cashew in-country, the result may have been quite the opposite. With no sales possible to neighboring countries and some local industries unable or unwilling to compete at these prices, it would appear that raw cashew nut was exported

even more freely than before the ban. Furthermore, some factories with grading machines were able to buy raw material at bulk prices, grade it for quality (quality is mainly based on size) and export graded raw cashew nuts abroad. A healthy profit may be made from the simpler process of buying, grading, exporting and forgoing processing.

This year's experience with supply and demand and pricing may have a very sobering effect on what was considered a "boom" marketplace for cashew. At the very least, there is a fundamental need to examine the question of economies of scale in the cashew processing industry and the abiding need for greater efficiency and effectiveness as a processor. Many of these businesses grew out of the export trade, and because they always had the outlet of being able to continue to export raw cashew nut, and thus maintain their margins, the matter of efficiency of processing needs more attention. Building a factory, processing nuts is no longer a "slam dunk" for just anyone. At a minimum a more detailed financial analysis will be required prior to establishing these types of factories in the future, taking into consideration the increasing complexity of the value chain in the region and its connection with the global market.

- **Faulty Statistics and Sector Strategy**—The case of Côte d'Ivoire mentioned above underscores a recurrent need in the sector, **the matter of reliable statistics** on which to base sector strategy. Several sources cite production of raw cashew nut in CDI at levels of 450,000 to up to 600,000 metric tons per year. This is an astonishingly large amount considering that it is about $\frac{3}{4}$ of what India, the world's leading producer yields, against the relatively small size of CDI. It is even more surprising in that in 1990, the annual production was reported at just 6000 metric tons. How a country could have made such significant, orders of magnitude increases in production, in such a short time, and also considering that many of the cashew trees were planted decades ago, remains unexplained.

Looking at those sorts of totals, some basic calculations are warranted. If average production per hectare were 450 kg of raw nuts, then the total area planted to cashew would have to be one million hectares. Furthermore, and given field based observations, the cashew stands in CDI are rarely well ordered, dense, pruned and highly productive, and it is unlikely that average yield per hectare achieves the 450 kg mark, and indeed, in this consultant's estimate is probably a lot lower. Reading land-use data for CDI, reputable sources such as FAO barely rank cashew. The country is known to have significant areas of permanent crops but of course, this includes cacao (CDI is the world's leader in cacao production), coffee, oil palm and rubber.

It would be ironic but not without precedent to point out that the Government of CDI, well intentioned in closing its land borders to cross border trade in raw cashew nuts to stimulate the establishment of additional processing capability, had done so based on a faulty estimate of total production. There is some reason to believe that at some point, cashew exports through the Port of Abidjan were mistakenly attributed to local production when in fact they were the result of exports from many of the neighboring countries which use this port.

Fortunately, there are a number of specialists who are attempting to upgrade the database and to use it more systematically to assist with policy decisions regarding sector strategy. Sorting out the statistical baseline would seem like an ideal role for an organization like the African Cashew Alliance.

- **Boom to Bust... Hopefully Not!**—Current plant closings are worrisome for a number of reasons including the loss of many jobs in a number of countries, many of which typically went to young women. Then too, there is some question whether over-leveraged operators will actually survive even one year of inactivity. What is clear, however, is that now is an excellent moment to re-examine the economic and financial underpinnings of the cashew processing industry and identify, if possible, more effective and sustainable ways of stimulating their

development. Given the globalized nature of the cashew marketplace, West Africa sector development strategy must first be a regional strategy in which individual countries can find their role and place.

For example, as a result of this consultancy, it has clearly been demonstrated that solutions to the management of the waste stream should probably best be addressed by a country or even a locality-based strategy. An aggregating industry which can collect the waste streams of a series of smaller processing plants, press it for CNSL and use the pressed cake for some kind of industrial energy application, seems like a very viable option far superior than asking each industry to do these things on their own.

It is at this level as well that the producer nations can broker the question of cross border flows of raw materials. Good product margins to-date may contract and the economic radius for the transport of the sub-products of the cashew industry...CNSL, pressed cake and cardanol oil...would be more limited. Learning together and ensuring sound investment responses can help to reduce costs and thus enhance margins. The trends being promoted by ACA and the Trade Hub, seeking to garner a reputation for quality product and sustainable processing, will benefit all. The marketplace is the developed world which has shown itself willing to pay premium prices for quality cashew products so West Africa needs to pull together to take advantage of this continuing demand.

- **Ample Opportunities to Increase Production**—Many of the cashew plantations in the West Africa region are older and few of them have been properly managed over the years. There is ample opportunity to apply basic stewardship and management skills to raising the production and productivity in a number of the countries within the value chain. Replanting older stocks, filling-in density in older stands, planting new, more organized and densely spaced plantations of high production hybrid stock, pruning, checking site fertility and adding nutrients, including trace elements, limited soil conservation treatments on sloping land, are all options which could raise unit productivity (annual production of raw cashew nuts per hectare).

A consideration of these needs will go hand-in-hand with a long-term view of how to cope with the impact of global climate change on West African cashew growers. These permanent tree crop areas will add a degree of resilience to current land-use patterns which will serve well under changing climatic conditions. Happily, it would also appear that farm-gate prices for raw cashew nut have been maintained despite the volatility in the sector today, and given rising world demand for cashew, there is no reason to believe it will abate. It is often said that money does not grow on trees but one might reconsider that axiom when discussing cashew in West Africa.

- **Leadership Changes at the African Cashew Alliance—An Opportunity**—The Trade Hub's major partner for the Cashew Value Chain, the African Cashew Alliance, is currently experiencing a very ordered change of leadership. Given the current micro-economic challenges to the cashew sector in West Africa, it is the perfect opportunity to reconsider the mandate and priority role of the ACA which has benefitted from USAID support for almost a decade. The organization is very well suited for brokering the sector-wide understandings that will underpin the future development of the Cashew Industry in West Africa and find the common ground that will enable it to continue to prosper in the coming years. This consultant would suggest **a series of priority actions by ACA** as the new leadership takes over, including the following:
 - A concerted effort to improve the database and developing the analytical skills and that will ensure a sound basis for sector policy and strategy.

- Develop a reference list of “peer reviewed” articles about the cashew industry and post them on their website.
- Put together a “white paper” on the development options for the cashew sector including both producers and processing industries in West Africa.
- Participate in and/or lead a lobbying effort with national governments of the Region about free trade in the sector.
- Offer a training course on entrepreneurial skills for cashew processing industry personnel.