

Cashew Processing Guides

Number 4

Guidelines for Choosing Raw Cashew Nut Processing Equipment



Published by:

Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Dag-Hammarskjöld-Weg 1 - 5

65760 Eschborn, Germany

T +49 61 96 79-0

F + 49 61 96 79-11 15

I www.giz.de

Registered offices:

Bonn and Eschborn

Germany

Place and date of publication:

Ghana, June 2019

Responsible editor:

Rita Weidinger (Executive Director)

GIZ/ Competitive Cashew initiative)

H/No. 313A, Cotonou Street

East Legon Residential Area - Accra, Ghana

T + 233 207 70 54 01

F + 233 302 77 13 63

Contact:

cashew@giz.de

Photo:

© GIZ/ComCashew

Guidelines for Choosing Raw Cashew Nut Processing Equipment

Contributors

Mary Adzanyo

Jim Fitzpatrick

Shakti Pal

Rowel Kutie Weyori

A Competitive Cashew initiative publication in cooperation with



implemented by
giz
Gesellschaft für Internationale Zusammenarbeit



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Economic Affairs SECO



The Competitive Cashew initiative (GIZ/ComCashew)

313A Cotonou Street, East Legon

P. O. Box KIA 9698

East Legon, Accra, Ghana



Cashew Processing Guides

Number 4: Guidelines for Choosing Raw Cashew Nut Processing Equipment

© Copyright: GIZ/ComCashew 2019

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise without permission in writing from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH or Competitive Cashew initiative (GIZ/ComCashew).

GIZ/ComCashew encourages fair use of this material. Proper citation is requested.

ISBN: 978-9988-2-9226-3

Preface

The Competitive Cashew initiative (GIZ/ComCashew) - formerly African Cashew initiative (GIZ/ACi) - conducted a comprehensive study on raw cashew nut processing equipment (ACi, 2011), through consultations with cashew industry investors worldwide. The study revealed areas of concern related to raw cashew nut processing. The main questions posed by cashew processors and potential investors who wanted to set up businesses in Africa evolved around raw cashew nut processing, equipment types and food safety.

In response, GIZ/ComCashew has published a series of five (5) cashew processing guides to provide useful information and practical materials to the industry, notably to new processors entering the raw cashew nut processing business in Africa and existing processors who plan to upgrade or expand their cashew processing factories.

Prospective investors in cashew processing face major challenges in making choices of processing equipment that are appropriate for the scale of their planned factories. The purpose of this Cashew Processing Guide Number 4: *Guidelines for Choosing Raw Cashew Nut Processing Equipment* is to provide information for informed decision-making on appropriate cashew processing equipment suitable for setting up a cashew processing factory.

This guidebook will serve as a resource and reference for new investors in the raw cashew nut processing business. The information in this guidebook enables new processors to make informed decisions about the choice of cashew processing equipment and suppliers that correspond with the planned cashew processing practices, processing methods and models, factory size and management systems to ensure viability and competitiveness of their processing business.

Acknowledgements

In developing this Guidebook, we received contributions and support from several partners and industry stakeholders to whom we are deeply grateful. We acknowledge, with thanks, the support of two groups of collaborators:

1. Cashew Stakeholders: This guidebook is built on our shared learning over the years

- African Cashew Alliance
- Association National des Transformateurs d'Anacarde du Burkina Faso
- Cashew Club
- Cashew Industry Association and Processors in Ghana
- Conseil du Coton et d'Anacarde de la Côte d'Ivoire
- Conseil National des Transformateurs de Cajou du Benin
- Groupement des Industriels du Cajou de la Côte d'Ivoire
- Ministère d'Agriculture de la Côte d'Ivoire
- Ministère d'Agriculture, Elevage et Pêche du Benin
- Ministère d'Agriculture, et des Aménagement Hydraulique and la Direction Générale pour la Promotion de l'Economie Rurale du Burkina Faso
- Ministère du Commerce, l'Industrie et de l'Artisanat du Burkina Faso
- Ministère de l'Industrie et des Mines de la Côte d'Ivoire
- Ministry of Food and Agriculture of Ghana
- Ministry of Trade and Industry of Ghana
- Technoserve

2. Technical review committee who participated in reviewing the manuscripts for publication:

- Mallikarjuna Kumaraswamy (Olam), David Heubi (Gebana Afrique), Vikram Dahiya Singh (Afrique Agri-Industrie), Dominique Sounlin (Kake 5 Industrie), Minata koné (Burkina Cajou), Rita Weidinger (GIZ/ComCashew), Helene Widmer (GIZ/ComCashew) and Ernest Mintah (African Cashew Alliance).
- Experts from African cashew processing businesses

The Technical Review Committee reviewed and approved the final draft of the manuscript for publication. We acknowledge and are grateful for contributions received from cashew processing experts who took time to work with us to review and provide critical feedback to enrich the contents of this guidebook.

We acknowledge the contributions of the following persons: Anthony Youdeowei (International Publishing Consultant), Ann-Christin Berger (GIZ/ComCashew), Nunana Addo (GIZ/ComCashew) and Sylvia Pobee (GIZ/ComCashew).



Contents

Preface.....	v
Acknowledgements	vi
Contents	ix
1. Introduction.....	01
Step One (1): Assess the Factory Equipment Requirements.....	02
Step Two (2): Evaluate Equipment	05
Equipment Evaluation Card (EEC)	06
Step Three (3): Evaluate Supplier Performance.....	09
Supplier Evaluation Card (SEC).....	10
Step Four (4): Adopt a Purchasing Strategy.....	13
Step Five (5): Informed Decision Making.....	15
Other Titles in this Series	16
Recommended Reading	16
References.....	17
Glossary of Raw Cashew Nut Processing Terms	18
Acronyms / Abbreviations.....	20



1. Introduction

The global market for cashew processing equipment comprises suppliers of specialised and generic equipment. Cashew processing equipment can mainly be sourced from India, Sri Lanka, Vietnam, China, Thailand, Italy and Brazil. Suppliers offer a wide range of equipment for potential investors for their planned cashew processing lines.

All cashew processing equipment is imported into Africa, therefore investors are confronted with the following challenges:

- Suppliers demand full payment for equipment before delivery.
- After delivery of equipment, processors have difficulties in requesting for equipment modifications.
- Questioning the suppliers' performance claim of equipment.
- Installation and availability of instruction manuals in the language of the investor.
- Maintenance of equipment and acquisition of equipment spare parts.

The decisions on the type and model of equipment will determine the efficiency of the cashew processing factory and profitability of the business. It is, therefore, important to identify the various equipment options available and to understand how they fit into the processing line.

This Guidebook is organized into five (5) steps which are consistent with activities involved in the procedure for choosing and purchasing cashew processing equipment. The five steps are summarized in Table 1.

Table 1: Checklist for Procuring Cashew Processing Equipment

Step No.	Description of Activity
1	Assess the Factory Equipment Requirements
2	Evaluate the Equipment
3	Assess Supplier Performance
4	Adopt a Purchasing Strategy
5	Informed Decision Making

Step One (1): Assess the Factory Equipment Requirements

Before purchasing cashew processing equipment, processors should carefully assess their factory needs to determine the equipment that best fits the intended processing scale and model. The critical factors to consider are:

1. Factory Site

The factory site is important when assessing equipment needs. Access to utilities such as electricity, water and communication are essential for successful operations of the factory. The availability of spare parts and technical expertise are also crucial for smooth operations.

Key questions are:

- What types of equipment can be operated with the available utilities?
- How far are your RCN suppliers from the factory site?
- How and where can spare parts for the equipment be acquired?
- How and where can regular maintenance and repair services be sourced?

2. Size, Capacity and Expansion Plans of the Factory

The scale of the existing or planned factory depends on the capacity of the installed equipment. A factory must have enough equipment to process the volume of installed RCN capacity.

Key questions are:

- What is the available factory space?
- For a new investor, what type of equipment fits into the intended cashew processing line?
- For an existing processor, what type of equipment fits into the current business?
- What is the future expansion plan?

3. Nature of Raw Cashew Nuts (RCN)

The volume and nature of RCN largely determine the types of equipment that suit your cashew processing operations.

Key factors to consider are:

- Kernel outturn
- Nut count
- Moisture content
- Ease of peeling kernels
- Thickness of the shell
- CNSL content of RCN

These factors influence the performance of processing equipment; for example kernels that are difficult to peel make mechanised peeling less efficient.

4. Technical Knowledge, Expertise and Service Provision

Relevant expertise should be readily available to ensure that cashew processing equipment operates continuously and reliably.

The key questions are:

- What expertise is needed and available for the equipment to be acquired and operated?
- What is the reliability of the available expertise?
- What is the capacity of local service providers to maintain and service equipment?

5. Availability of Labour for the Factory

All cashew processing factories, either manual, semi mechanized or fully mechanized, require labour. The skills and expertise of factory workers need to be in line with the level of mechanisation.

The key questions are:

- How many workers are required for the model and scale of the factory?
- What are the overall labour costs?
- What are cultural norms that influence labour availability and performance?
- What are the existing and planned labour productivity levels?

6. Energy Supply

The constant and steady power supply is essential for the successful operations of a cashew processing factory.

Therefore key questions are:

- What is the estimated energy need for the factory?
- What is the estimated energy need for the equipment and infrastructure?
- Is there constant and steady electricity supply?
- What is the cost of electricity?
- What proportion of the operational costs is accounted for by energy supply?
- Are backup electric generators required to guarantee constant power supply to the factory?
- Will cashew shells be used as fuel?
- Will alternative sources of fuel such as gas be used?

Step Two (2): Evaluate Equipment

Equipment evaluation is important when procuring cashew processing equipment for your factory. Once the equipment is ordered, payment is effected, equipment is delivered and installed satisfactorily, it will be difficult to question the manufacturers' claims of equipment performance. Therefore, models of equipment should be evaluated before they are selected.

The equipment can be assessed according to the following criteria:

- 1) Type
- 2) Specification
- 3) Price
- 4) Usability

1) Type

Features for assessing types of equipment:

- The origin of the equipment, the manufacturer and/or the supplier
- The functioning of the equipment and its position in the cashew processing line
- Availability in the market
- Do-it-yourself / tailor-made equipment (Advise: Design the preferred equipment features with your equipment manufacturer)

2) Specifications

Features for assessing specifications of equipment:

- Equipment model (Advise: Look for the latest model)
- Requirements for installation
- Compatibility with other equipment in the processing line
- Processing capacity
- Power requirements
- Size of equipment
- Performance
- Efficiency
- Life span

In addition, potential investors should seek performance information from previous users of the equipment. They should also investigate on potential scalability and access to future equipment innovations.

3) Price

Features for assessing price of equipment:

- Current selling price of equipment
- Competitive selling price of equipment
- Suppliers contract terms
- Terms of Payment
- Financial Risks (Payment process, Exchange rate fluctuation)
- Availability and cost of spare parts
- Availability of user manual in the buyers language

4) Usability

Features for assessing use of equipment:

- Performance of the equipment
- Ease of use
- Maintenance and servicing
- Scalability and potential for upgrading of equipment
- After sales service
- Cleanliness and Food Safety Compliance

Equipment Evaluation Card (EEC)

An Equipment Evaluation Card (EEC), designed by Jim Fitzpatrick and the Competitive Cashew initiative (GIZ/ComCashew) for processors, has been successfully used in evaluating cashew processing equipment. A sample Equipment Evaluation Card is shown in figure 1

The evaluation criteria explained in *Step Two (2): Evaluate Equipment* has been adopted in completing this evaluation card.

Source: Jim Fitzpatrick and the Competitive Cashew initiative (GIZ/ComCashew)

An example of a completed Equipment Evaluation Card is shown on the right. Processors should follow this example to complete the blank EEC in figure 1.2.

Figure 1: Equipment Evaluation Card


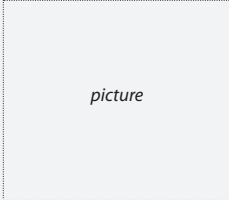
Date: 27 Feb. 2011		EEC No. B012	
Type of Equipment			
Model name			
One ton Mega Boiler			
Supplier			
Cao Thanh Phat			
Place in progress			
Pretreatment Generation of steam			
Country of manufacture		Vietnam	
Readily available	Yes	Other Options	Yes
Equipment Specifications			
Manufacturer specs			
Capacity	1000Kg per hour	Dimensions	--
Power requirements	3 phase, 7.5Kw		
Life span	--	Efficiency	Good
<i>Reported by users</i>			
Capacity	Confirmed	Efficiency	Users Happy
Pricing			
Price (FOB)	\$23,800	Warranty	Yes/1 yr
Payment Terms	40%, balance on delivery		
Installation cost	Full service available	Spare parts available	Yes, on demand
Equipment Usage			
<i>Ease of use</i>	Yes	<i>Maintenance</i>	Yes
Ease of use to operate		Easy to maintain	
Requires expertise	Medium skill	Requires expertise	Medium skill
<i>Cleaning</i>		<i>After sales service</i>	
Easy (Yes/No)	Yes	Provided	--
Food safety compliant	Yes		
Comments			
Medium skill level required to operate and maintain according to manufacturer			

Figure 1.2: Blank Equipment Evaluation Card

Figure 1.2: Blank Equipment Evaluation Card (EEC)

Date:		EEC No.	
Type of Equipment		<div style="border: 1px dashed gray; padding: 10px; text-align: center;">  <p>picture</p> </div>	
Model name			
Supplier			
Place in progress			
Country of manufacture		Vietnam	
Readily available		Other Options	
Equipment Specifications			
Manufacturer specs			
Capacity		Dimensions	
Power requirements			
Life span		Efficiency	
<i>Reported by users</i>			
Capacity		Efficiency	
Pricing			
Price (FOB)		Warranty	
Payment Terms			
Installation cost		Spare parts available	
Equipment Usage			
<i>Ease of use</i>		<i>Maintenance</i>	
Ease of use to operate		Easy to maintain	
Requires expertise		Requires expertise	
<i>Cleaning</i>		<i>After sales service</i>	
Easy (Yes/No)		Provided	
Food safety compliant			
Comments			

Step Three (3): Evaluate Supplier Performance

The following factors should be considered in evaluating supplier performance:

1) Assessing Suppliers Offer

- Is the supplier's sales strategy responsive?
- Does the supplier demonstrate full understanding of the cashew processing process?
- Does the supplier offer a full range of equipment?
- Does the supplier offer a favourable service contract?
- Does the supplier offer a warranty over an acceptable period of time for the equipment supplied?
- Is the supplier responsible for the delivery and installation of the equipment in your factory at no extra cost to the processor? Is there a full disclosure of any extra cost involved?
- If the supplier is not installing the equipment, are there alternative arrangements for the installation?
- If the supplier offers ancillary equipment, for example compressors sourced from another manufacturer, who is responsible for providing spare parts and servicing this equipment?
- What is the track record of equipment suppliers? Do the suppliers respond appropriately to customer requirements?
- What are the arbitration arrangements for resolving disputes?

2) Assessing Risk Associated with Suppliers Offers

Relationship

- Have you met a senior staff of the supplying organisation?
- Is the supplier reliable? Does the supplier have a good image among other processors?
- Have you seen the equipment successfully operated?

Financial Risk

- Have the suppliers been in stable business for long?
- What are the annual sales?
- What is their bank credit rating?

- What is the legal status of the company?
- What is the legal jurisdiction of the equipment purchase contract?

Equipment Quality Risk

- Have you seen the equipment successfully operated?
- Does the supplier fully understand the equipment requirements of the processor?
- Have they provided references for the equipment being assessed?
- Does the supplier have the legal rights to produce or to sell the equipment being offered?
- Does the manufacturer produce the original model of the equipment?

Delivery Risk

- Does the supplier have the experience and knowledge to manage the order?
- Does the supplier have experience of shipping cashew processing equipment to your country?
- Are there any trade restrictions or duties on export from the country of manufacture or on importation into your country?
- How long will it take to manufacture the equipment?
- How long will it take to ship the equipment?
- What are the arrangements for the equipment transit insurance?

Supplier Evaluation Card (SEC)

A Supplier Evaluation Card (SEC), designed by Jim Fitzpatrick and the Competitive Cashew initiative (GIZ/ComCashew) for processors, has been successfully used in evaluating supplier performance. A sample Supplier Evaluation Card is shown in figure 2.

The key questions for evaluating supplier performance in *Step Three (3): Evaluate Supplier Performance* have been adopted in completing this evaluation card.

Source: Jim Fitzpatrick and the Competitive Cashew initiative (GIZ/ComCashew)

An example of a completed Supplier Evaluation Card is shown on the right.

Processors should follow this example to complete the blank SEC in figure 2.1.

Figure 2: Supplier Evaluation Card


Date: 20.09.2015		SEC No.		A001
Supplier Information				
<i>Supplier Name</i>		<div style="border: 1px dashed gray; width: 150px; height: 100px; margin: 0 auto;">  </div>		
XYZ Company Limited				
<i>Contact</i>				
XYZ, xxxxxxxxxxxxxxxxx				
<i>Services Offered</i>				
Sale of cashew processing equipment				
Installation of cashew processing equipment				
Terms of Sales				
Terms		70% down payment, balance on delivery		
Contract		Yes	Warranty	Yes, 1 year
Installation		Full package, cost includes travel		
<i>Equipment sold</i>				
Boiler, automated shellers, peeling machines				
After Sales Service				
Service available		Yes upon request		
Spare parts in-stock		Parts available on market		
In country technician		Yes, certified agent in country		
Reliability (Reported by Customers)				
Delivery on time		Yes, deliver per dates		
Product delivered as agreed		Yes, product in good condition		
Carry out installations		Yes, complete package		
Regular after sales service		Yes, upon request		
In country technician/agent		Yes, agent readily available		
Respond quickly to requests		Good communication system		
Comments				
Supplier delivers on time good quality product				
Responds quickly to complaints and calls				
Has good customer relations				

Figure 2.1: Blank Supplier Evaluation Card (SEC)

Figure 2.1: Blank Supplier Evaluation Card

Date:		SEC No.	
Supplier Information		<div style="border: 1px dashed gray; width: 150px; height: 100px; margin: auto;"> <p>Logo</p> </div>	
<i>Supplier Name</i>			
<i>Contact</i>			
<i>Services Offered</i>			
Terms of Sales			
Terms			
Contract		Warranty	
Installation			
<i>Equipment sold</i>			
After Sales Service			
Service available			
Spare parts in-stock			
In country technician			
Reliability (Reported by Customers)			
Delivery on time			
Product delivered as agreed			
Carry out installations			
Regular after sales service			
In country technician/agent			
Respond quickly to requests			

Step Four (4): Adopt a Purchasing Strategy

Two major strategies can be adopted in purchasing cashew processing equipment:

1) One-Stop-Shop Strategy

- This strategy involves purchasing the complete processing line equipment from one supplier (Fitzpatrick, J, 2014.)
- It implies that processors place trust in their own judgement to select the most reliable supplier to deliver the equipment.

Advantages:

- Compatibility of equipment components in the processing line is assured.
- The supplier is responsible for assembling the equipment for the processing line.
- Placing the equipment order with one supplier is more efficient, which makes it easier to negotiate the service contract
- There is a high possibility to raise finance from financial institution with one reliable contract/supplier
- There is a closer relationship between client and supplier

Disadvantages:

- The initial investment cost is higher for a full processing line
- There may be a limited choice of equipment from one supplier
- Not every component in the processing line may be the best model in the market
- The financial and delivery risk are concentrated with one supplier

2) Do It Yourself (DIY) Strategy

- In this strategy, the processor assembles the equipment components for the full cashew processing line (African Cashew initiative, 2011).
- Thus, the processor aligns the best available and most suitable equipment for cashew processing.

Advantages:

- It provides the processor with the opportunity to select the most efficient equipment component for each section of the processing line

- The processor is responsible for assembling equipment components of the processing line
- The financial and delivery risks are spread across a range of suppliers

Disadvantages:

- The process of purchasing different equipment from a variety of suppliers is highly demanding and requires more expertise on processing equipment
- The efficient assembly of different equipment component requires high level of technical in-house expertise
- For a new investor, it might be challenging to efficiently assemble equipment components of the processing line
- There is limited opportunity of seeing a complete and operational processing line with the different equipment components a processor intends to purchase
- Placing the equipment order with multiple suppliers makes it more difficult to negotiate service contracts

This strategy is probably best suited for existing factories, who want to expand, renovate or open new factories. This strategy can be best adopted, if the processor has sufficient knowledge, experience and access to good communication.

Step Five (5): Informed Decision Making

The decision of purchasing cashew processing equipment must be based on reliable information on the equipment and the supplier. The following key issues should be considered to inform a processors decision:

1. Assess own equipment and supplier needs carefully.
2. Conduct detailed research on all available equipment and suppliers.
(Advise: Consult with other processors and cashew associations)
3. Prepare an operation and budget plan based on available funds.
4. Prepare a business plan that includes an equipment section that specifies equipment needs, service contract, warranty, installation, local service providers, payment terms, factory space, processing capacity and energy.
5. Develop a long-term business vision for scaling up and scaling out.
6. Conduct a critical comparison of the quotations from different suppliers to select the quotation that gives the best value for money.
7. Ensure to have a written purchasing contract with the selected supplier.
8. The contract should address all critical issues such as: equipment model, terms of delivery, warranty, national import duties and regulations, installation of equipment and after sales service.

Take note of the following issues when placing overseas orders for cashew processing equipment:

1. Institutional/company procurement procedures
2. Country guidelines for overseas purchases
3. Bank procedures for payments for overseas orders

Other Titles in this Series

- **Cashew Processing Guide Number 1:** Guidebook on the Cashew Processing Process
- **Cashew Processing Guide Number 2:** Opportunities and Challenges in Raw Cashew Nut Processing
- **Cashew Processing Guide Number 3:** Guide to Raw Cashew Nut Processing Equipment
- **Cashew Processing Guide Number 5:** Food Safety, Traceability and Sustainability in Raw Cashew Nut Processing

Recommended Reading

These references provide further information for sustainable and competitive raw cashew nut processing.

- **Cashew Processing Guide Number 1:** Guidebook on the Cashew Processing Process
- **Cashew Processing Guide Number 2:** Opportunities and Challenges in Raw Cashew Nut Processing
- **Cashew Processing Guide Number 3:** Guide to Raw Cashew Nut Processing Equipment
- **Cashew Processing Guide Number 5:** Food Safety, Traceability and Sustainability in Raw Cashew Nut Processing
- Summary Equipment Study Report, African Cashew initiative/Jim Fitzpatrick 2011; www.comcashew.org
- Competitiveness of African Cashew Sector, African Cashew initiative/Jim Fitzpatrick 2010; www.comcashew.org

References

African Cashew initiative. (2011) *Cashew Processing Equipment Study*, Accra, Ghana: African Cashew initiative (GIZ/ACi), available at: www.comcashew.org

Fitzpatrick, J. (2011) African Cashew Initiative (GIZ/ACi) summary of the study "Cashew Nut Processing Equipment Study" available at <http://aci.africancashewalliance.com/eng/downloads.html>. Accessed on: 8.02.2015

Fitzpatrick, J (2014). Equipment and technologies of cashew processing; A presentation of Procurement strategies

African Cashew initiative. (2011). "Cashew Processing Open Space" – Purchasing Strategies; presented at the ACA conference in September 2011

Glossary of Raw Cashew Nut Processing Terms

Calibration of raw cashew nuts: Grouping the raw cashew nuts into various sizes (based on the diameter of the nuts) to facilitate shelling and reduce breakage during processing.

Cashew Nut Shell Liquid (CNSL): Caustic liquid found in the cashew shell.

Cashew processing lines: A complete set of equipment required for RCN processing.

Conventional: Cashew kernels produced and processed without organic or fair-trade certification.

Drum roast: Method of heat treatment of raw cashew nuts by use of direct heating of raw cashew nuts in a drum.

Food safety: Handling, preparation and storage of food in ways that prevent foodborne illness. It includes a number of routines that should be followed to avoid potentially severe health hazards.

Grading: Classification of the kernels based on colour, shape (whole/broken) and size. Grading is done manually or with machines.

HACCP: Hazard Analysis and Critical Control Points – Factory safety system.

Hand cracking: Shelling (separation of kernel from shell) raw cashew nut manually using small hand shelling machine.

Heat treatment: Application of direct heat, hot oil or steam to the cashew nuts in preparation for breaking of the shells. Heat treatment makes it easier to remove the shells.

Kernel: Consumer product obtained after processing of raw cashew nut is the kernel. The kernel is the edible part of the raw cashew nut.

Kernels Outturn: The weight of kernels obtained during processing of a given quantity of RCN, usually expressed as a percentage.

Oil bath: Method of heat treatment using hot CNSL bath to extract CNSL of raw cashew nuts to make them brittle.

Outturn (in RCN trade): Weight of kernels in pounds per 80kg bag of in-shell nuts. Outturn (in RCN trade) is not the same as kernels outturn as the cutting test does not establish breakage, grades and processing losses.

Oven drying & humidification of kernels: Application of heat to kernels, followed by subjecting the kernels to humid conditions. While drying reduces the moisture levels of the kernels and brings about contraction of the testa, humidification increases the moisture levels and leads to expansion of the testa. This process facilitates the removal of the testa without breaking the kernels. The process is also described as “*thermal shock*”.

Peeling: Removal of the testa from the kernels. The objective is to obtain the kernels whole and intact. Peeling is done either by peeling machines or by hand, using small knives.

Quality standards: A set of criteria on the requirements, specifications, guidelines or characteristics to ensure that materials, products, processes and services are fit for their purpose.

RCN: Raw Cashew Nuts – also known as in-shell nuts. These are dried raw cashew nuts with the shell still intact.

Shell: Outer coat of the raw cashew nut before shelling.

Shelling: Removal of the cashew kernel from its shell or separation of the kernel from its shell. This is achieved through cracking or cutting to expose the kernel with testa for separation.

Testa: Inner skin surrounding the cashew kernel after the shell has been removed. The testa lies between the shell and the white kernel. During processing, the testa is removed after having been rendered brittle or soft by heat treatment.

Vacuum packing: Method required by buyers for packaging cashew kernels. The process involves a vacuum and back flushing with a combination of carbon dioxide and nitrogen to prolong the shelf life of the kernels.

Warehousing: Storing the raw cashew nuts procured for processing. It ensures the continuous supply of raw nuts throughout the year.

Yield in processing: Mass of kernels in grams per kilogramme of in-shell nuts (%)

Yield per hectare or tree: Gross weight of cashew nuts per tree or per hectare

Acronyms / Abbreviations

ACA	African Cashew Alliance
ACi	African Cashew initiative
AFI	Association of Food Industries, USA
BMGF	Bill & Melinda Gates Foundation
BRC	British Retailers Consortium
CNSL	Cashew Nut Shell Liquid
GIZ/ComCashew	Competitive Cashew initiative
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization Statistics
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (German International Cooperation)
HACCP	Hazard Analysis & Critical Control Point
NGO	Non-Governmental Organization
RCN	Raw Cashew Nut
TNS	TechnoServe
UNECE	United Nations Economic Commission for Europe
US/USA	United States of America
USDA	United States Department for Agriculture
w/w	Weight by weight

The Competitive Cashew initiative (GIZ/ComCashew)

The Competitive Cashew initiative, formerly African Cashew initiative (GIZ/ACI) presents a new and innovative model of broad-based multi-stakeholder partnership in development cooperation. GIZ/ComCashew is a private-public partnership programme under the implementation of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, with funding from the German Federal Ministry for Economic Cooperation and Development (BMZ) as well as Cooperation Partners from the private and public sector.

GIZ/ComCashew's main objective is to increase the competitiveness of African cashew smallholders, processors and other actors along the value chain to achieve a lasting reduction of poverty in the project countries Benin, Burkina Faso, Côte d'Ivoire, Ghana and Mozambique. GIZ/ComCashew aims at ensuring that by 2020, each of the 580,000 cashew farmers trained will earn an average additional annual family income of at least US\$600.

Beyond increasing farmers' direct income, the initiative aims at improving cashew-processing capacity in Africa, developing sustainable supply chain linkages and supporting a better organization and coordination of the cashew sector. GIZ/ComCashew also strengthens initiatives in the cashew sector and responds to questions regarding investment and processing.

It is time to accumulate and share the valuable experience and knowledge gained in the cashew sector from farm to fork with policy makers, industry as well as potential investors in the cashew sector in Africa.

This *Guidelines for Choosing Raw Cashew Nut Processing Equipment* is a practical guide for new investors and existing processors in the raw cashew nut processing business.

It provides valuable information on the following:

- Evaluation of cashew processing equipment
- Evaluation of equipment suppliers
- Purchasing strategies for cashew processing equipment
- Informed decision making in purchasing cashew processing equipment

Other Titles in this Series

- **Cashew Processing Guide Number 1:** Guidebook on the Cashew Processing Process
- **Cashew Processing Guide Number 2:** Opportunities and Challenges in Raw Cashew Nut Processing
- **Cashew Processing Guide Number 3:** Guide to Raw Cashew Nut Processing Equipment
- **Cashew Processing Guide Number 5:** Food Safety, Traceability and Sustainability in Raw Cashew Nut Processing

