

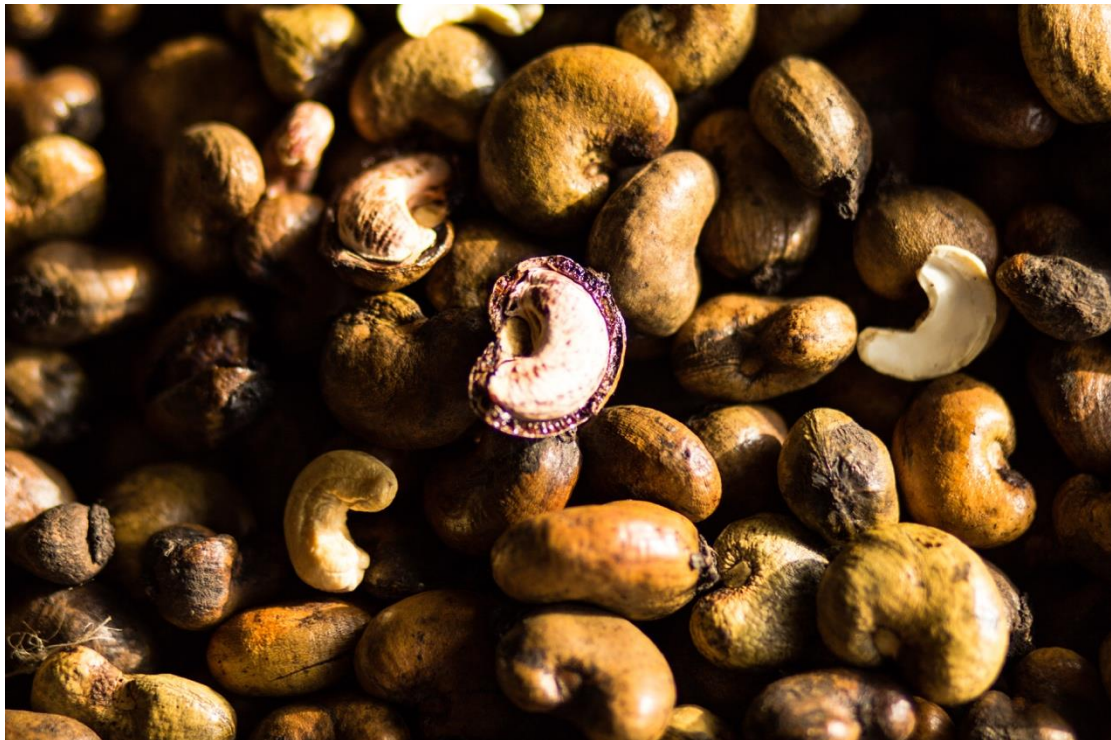
LEARNING FACILITATING MATERIALS

NATIONAL CERTIFICATE LEVEL 2

TRADE AREA: **CASHEW TRADE**

UNIT 7

WAREHOUSING OF RAW CASHEW NUTS





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UNIT INTRODUCTION

Welcome to Unit 7 of your learning journey in cashew trade. This guide explains the main steps in warehousing raw cashew nuts for international trade and local processing.

Do you already know how to store raw cashew nuts?

Cashew buyers and processors purchase high volumes of raw cashew nuts during the harvest season from January to May/June and store them afterwards for processing throughout the entire year. However, the quality of raw cashew nuts decreases if the product is not stored appropriately.



In this unit, you will learn about warehousing of raw cashew nuts in order to maintain a high-quality product. The learning material covers four sub-units:

- 1) Receiving raw cashew nuts
- 2) Drying raw cashew nuts
- 3) Grading raw cashew nuts
- 4) Storing raw cashew nuts

Each sub-unit contains theoretical and practical exercises. Each module includes written materials, visuals as well as self-assessments to test your knowledge and skills.

Drying of raw cashew nuts to the appropriate moisture content and bagging them in jute sacks are the most important pre-conditions for maintaining a high-quality product during storage. A ventilated warehouse is an appropriate location to keep raw cashew nuts throughout the entire year.

If you do not follow the recommended warehousing practices explained in this unit, the quality of your product deteriorates, which will have an effect on the raw cashew nut price in international trade and on processing yields – that is in obtaining whole white kernels.

Even though this learning material provides essential information on warehousing of raw cashew nuts in cashew trade for National Certificate Level 2, you should also look out for new information, innovations and technological advances during your practical work that expand your knowledge and skills.

Do you want to become an expert in cashew? This is your chance!

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ICONS



LEARNING
OBJECTIVES



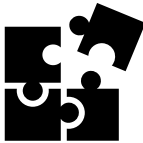
ATTENTION



PRACTICALS
HANDS ON



CROPPING
CALENDAR



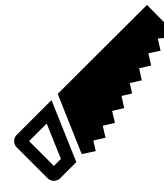
SELF ASSESSMENT



WELL DONE!



TAKE A BREAK!



DEMONSTRATE
USE OF
TOOLS

ABBREVIATIONS

Here are some commonly used abbreviations.

cm	Centimetre (<i>100 cm = 1 m</i>)
CNSL	Cashew nut shell liquid
g	Gram (<i>1000g = 1 kg</i>)
GAP	Good Agricultural Practices
lbs	Pounds (<i>1 kg = 2,20462 lbs</i>)
kg	Kilogram (<i>1 kg = 1000g</i>)
KOR	Kernel Outturn Ratio
m	Meter (<i>1 m = 100 cm</i>)
m²	Square meter (<i>1 m x 1 m</i>)
mm	Millimetre (<i>10 mm = 1 cm</i>)
MT	Metric Tons (<i>1000 kg = 1 MT</i>)
RCN	Raw cashew nuts

1. DEMONSTRATE SKILLS FOR RECEIVING RAW CASHEW NUT IN CASHEW PRODUCTION

a) Explain reception of raw cashew nut

The reception of raw cashew nuts refers to the process of weighing, quality testing and documenting raw cashew nut quality and quantity.

Receiving raw cashew nuts can take place in two different locations:

- At the warehouse – for storage and raw cashew nut trade
- At the processing factory – for storage and local processing throughout the year



The reception of raw cashew nuts takes place during harvest from January to May.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec



Source: GIZ/ComCashew – Point of reception and warehouse for raw cashew nuts

b) State the importance of raw cashew nut reception

Raw cashew nut reception is important for product documentation and traceability.

1. Documentation

It is important to document the incoming quality and quantity of the raw cashew nuts that you are buying.

Relevant data are:

- Name of the farmer
- Source of origin (e.g. farming community)
- Weight of each bag (80 kg of raw cashew nuts in each bag)
- Number of 80 kg bags
- Overall product quantity (Number of 80 kg bags x 80 kg)
- Reference to any product quality control records
 - KOR
 - Nut count
 - Moisture content
 - Defective nuts
- Date of purchase
- Purchasing price
- Bonuses paid for higher quality products
- Organic or conventional product



Source: GIZ/ComCashew – Reception of raw cashew nuts

There are three (3) copies of sales transaction documents for:

1. the warehouse manager
2. the buying company / processor
3. the farmer

Documentation is important for both buyers and farmers to:

- enable payments according to quality
- ensure sustainable supply of high-quality produce
- establish loyalty programs for farmers, by providing bonus payments to farmers for higher quality supplies
- document business operations of farmers to increase their bankability and opportunities to access loans for farm investments and/or expansions



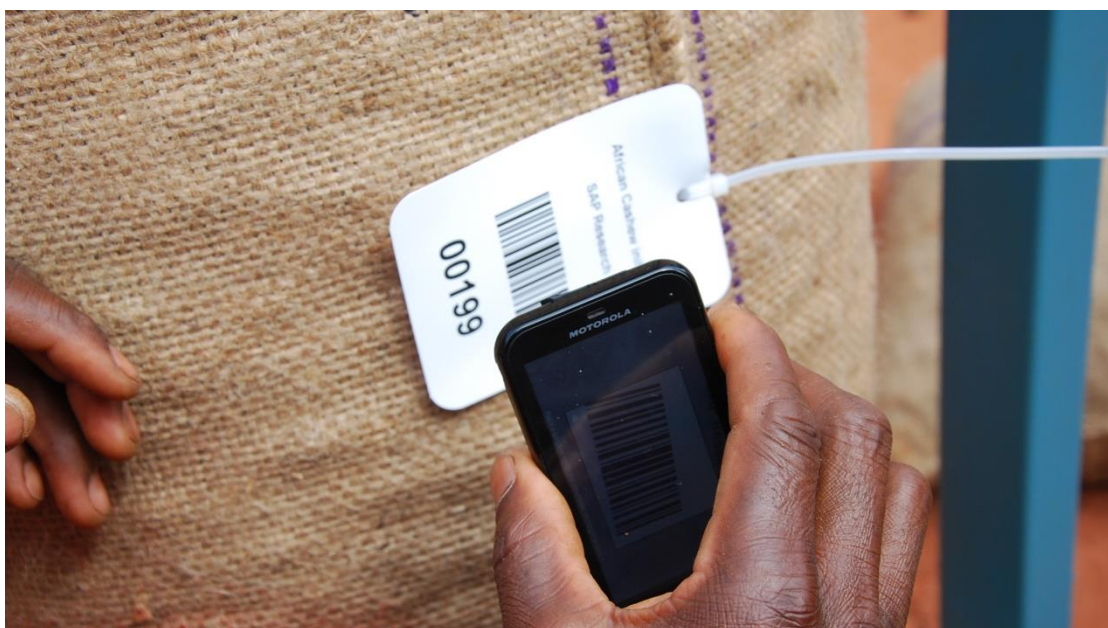
A farmer passport helps with keeping records and documenting sales transactions with individual farmers. It also serves as a ledger account for each farmer.

2. Traceability

Traceability in the cashew industry is important, especially if you target the European market, as it is a legal requirement for foreign products that enter Europe. The implementation of effective traceability systems starts at the farm gate during raw cashew nut reception.

Traceability is in the interest of all value chain actors – farmers, buyers, processors, roasters and end consumers – to guarantee a high-quality product and to receive profitable margins with every transaction along the supply chain.

Traceability also enables buyers and processors to intervene on the production level, if the raw cashew nut quality decreases by supporting farmers with, for example, training on the application of Good Agricultural practices or the supply of farm inputs (e.g. improved cashew seedlings for farm expansion or rejuvenation, chainsaws for maintenance of productive cashew farms).



Source: GIZ/ComCashew – SAP Traceability App

c) **State the activities involved in raw cashew nut reception**

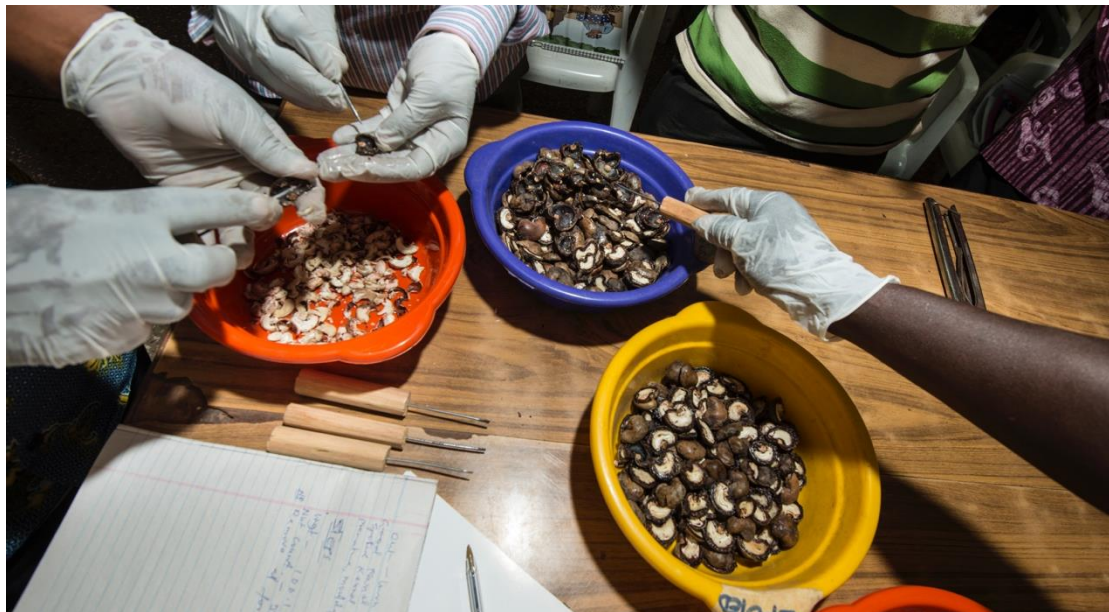
1. Quality testing

A quality test is a way to verify product quality and to detect defects in raw cashew nuts and kernels before purchase. When you receive larger quantities of raw cashew nuts (more than 20 bags), you should conduct quality testing before purchase to ensure that the product quality meets your expectations. Proper inspection and quality testing of raw cashew nuts are also important for cashew farmers, because it is common to pay higher prices for higher quality products. Quality tests enable negotiation between farmers and buyers based on product quality.

During the commercial transaction between a farmer and a buyer/trader/processor, several external criteria can be used to specify raw cashew nut quality:

- Colour
- Shape
- Brightness

However, the most important quality criterion is the kernel inside the shell.



Source: GIZ/ComCashew – KOR Quality test of raw cashew nuts

You can test the quality by conducting four (4) different quality tests:

- **Kernel Outturn Ratio (KOR) Test**
 - Outturn refers to the amount of usable kernels after de-shelling the raw cashew nuts. It is expressed in pounds (lbs), which means the weight of the useful kernels is weighed in pounds for one 80 kg jute bag of raw cashew nuts.
 - Quality Benchmark:
 - 49 – 52 pounds (lbs) of kernels in 80 kg of raw cashew nuts. A KOR of 49 pounds (lbs) means that 49 pounds (22.2kg) of kernels is usable if 80 kg of raw cashew nuts is shelled.
- **Defective Nuts Rate**
 - To determine the defective nuts rate, you need to weigh the kernels and the shells of these two categories:
 - Blue (premature and spotted kernels)
 - Red (stunted, empty, moth-eaten, mouldy and brown kernels)
 - Quality Benchmark:
 - Less than 24 % defective nuts
- **Nut count (number of nuts/kg)**
 - The nut count refers to the number of raw cashew nuts per kg. It is expressed in raw cashew nuts/kg.
 - Quality Benchmark:
 - The nut count fluctuates between 150 and 240 raw cashew nuts/kg.
- **Moisture content**
 - 7 - 10 %

For more information on the process of quality testing, study unit 4 on *Quality Assurance and Management in Cashew Production*

2. Weighing

Weighing of raw cashew nuts is important in order to determine the weight of the product delivery. Knowing the weight of your product also helps in negotiating for a good price. Use 80 kg jute bags for proper storage, stocktaking and to facilitate marketing of your product.



Source: GIZ/ComCashew – Weighing of RCN

3. Labelling

Document data for traceability in the production segment of the supply chain:

- Name of farmer
- Source of origin (e.g. farming community, region)
- Quality of raw cashew nuts
- Quantity of raw cashew nuts
- Date of purchase
- Purchasing price
- Bonuses paid for higher quality products
- Organic or Conventional Product

d) Outline the procedure for raw cashew nut reception

Use the checklist to follow steps 1 to 6 in receiving raw cashew nuts. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rate
1. Sample raw cashew nuts and conduct quality testing if you receive larger quantities (20 bags and more) <ul style="list-style-type: none"> • KOR • Defective nut rate • Nut count • Moisture content 	
2. Weigh raw cashew nuts to determine the volume for purchase and storage	
3. Negotiate with the farmer and pay a fair price for the product quantity and quality. If the quality is high, pay a bonus!	
4. Document the most relevant information: <ul style="list-style-type: none"> • Name of the farmer • Source of origin (e.g. farming community) • Weight of each bag (80 kg of raw cashew nuts in each bag) • Number of 80 kg bags • Overall product quantity (Number of 80 kg bags x 80 kg) • Reference to any product quality control records • Date of purchase • Purchasing price • Bonuses paid for higher quality products • Organic or Conventional Product 	
5. Fill the raw cashew nuts in jute bags (up to 80 kg) for proper storage, stocktaking and marketing	
6. Label each bag with the documented information or use a traceability system e.g. bar codes to store the data digitally	

Failure is your opportunity to begin again more intelligently.

e) **Demonstrate the appropriate use of equipment and materials for raw cashew nut reception**



Practical Exercise: Go to the warehouse or processing factory and demonstrate the safe use of equipment for receiving raw cashew nuts.

- Use **Manual Weighing Scales** to ensure that each jute bag is filled with exactly 80 kg of raw cashew nuts.
 - For accurate measuring and reading, scales are calibrated before weighing products.



Source: <https://www.awmlimited.co.uk/va.html>

f) **Receive raw cashew nut**



Practical Exercise: Weigh raw cashew nuts and document the relevant data stated in this unit for each batch of raw cashew nuts that you are receiving.



Source: GIZ/ComCashew – Weighing of RCN during bagging



SELF ASSESSMENT

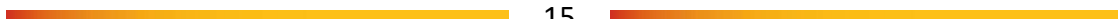
1. Explain reception of raw cashew nut.

2. State the activities involved in raw cashew nut reception.

3. Outline the procedure for raw cashew nut reception.



*Congratulations! You have completed the first set of questions.
Take a break before you move on to the next chapter.*



2. DEMONSTRATE SKILLS FOR DRYING RAW CASHEW NUT

a) Explain the importance of drying raw cashew nut for storage

Drying is the first step after receiving raw cashew nuts. It is important to dry raw cashew nuts to reduce the moisture content to a maximum of 9 %, which is ideal for warehousing.

Raw cashew nuts are air-dried in the shade or under sunlight for two reasons:

- To reduce the moisture content
- To mature the seed (kernel) that is inside the nut

The moisture content of 9 % slows down or completely prevents deterioration of the raw cashew nuts during storage.

Well-dried nuts are bagged in jute sacs for warehousing and use throughout the entire year.



Source: GIZ/ComCashew – Sun drying on tarpaulins



Drying takes place during cashew harvest from January to May, immediately after receiving the raw cashew nuts and before storage.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec

b) State the factors to consider in drying raw cashew nut for storage

Drying immediately after reception is essential in preserving raw cashew nut quality during storage.

A high moisture content may cause deterioration of the kernel due to:

- mould
- bacterial attack
- enzyme action

Uniform drying of raw cashew nuts is important to avoid cross contamination during storage. However, the moisture content of raw cashew nuts might differ after harvesting.

The moisture content of raw cashew nuts at harvest is dependent on:

- Climatic conditions
- Moisture content of the soil on which the nuts have fallen
- Weed growth density under the tree
- Time between cashew fruits fall to the ground and collection
- Drying on the farm before purchase



Raw cashew nuts are air-dried in the shade or the sun for 3 - 4 days. Sunny areas like the Northern parts of Ghana require drying under shade. More humid areas like the Southern parts require drying in the sun to avoid humidification of the cashew nuts.



Source: GIZ/ComCashew – Drying of RCN on tarpaulin under the sunlight



Make sure that you do not neglect this process in order to attain high-quality products.

c) Identify the methods for drying raw cashew nut for storage

Drying is done manually either on a clean concrete floor or on tarpaulins spread on a flat surface. Modern drying methods involve the use of drying machines that run on electricity.

Manual drying

For manual drying on a clean concrete floor or on tarpaulins, the drying areas should be smooth and slightly sloping to allow rainwater to run off.



The best method for drying is in batches. Only dry raw cashew nuts together that you received from the same farmer to facilitate uniform drying of the product.

When pouring the raw cashew nuts under the sunlight or on a shaded drying ground, it is important that the raw cashew nut layer is not thicker than 10 cm to ensure proper drying. This is approximately 60 kg of nuts per square meter (m²).

The nuts should be frequently raked and turned to ensure that they dry uniformly.

In the evenings, the nuts should be heaped together and covered. Heap the nuts while they are still warm. They will continue to dry under the cover of a tarpaulin or under palm leaves. In the morning, check the moisture content of the raw cashew nuts. Assess their need for either further drying or readiness for bagging. If further drying is required, spread the nuts evenly in the morning to continue the drying process.



The raw cashew nuts are fully dried when the moisture content of the nut is 9 % and below.



Pick some raw cashew nuts in your hand and shake them. If the nuts are well-dried, they will produce a rattling sound. The raw cashew nuts are then ready for bagging.

The colour of well-dried raw cashew nuts is light brown for the dry season crop and dark brown for the rainy season crop.

Do not dry:

- indoors
- on metallic surfaces
- under the scorching sun

When drying raw cashew nuts indoors, the quality of the raw cashew nuts will deteriorate because the raw cashew nut cannot release the moisture properly, which can result in infestation of the entire drying batch.

When drying raw cashew nuts in the heat, the quality of the raw cashew nuts will deteriorate because the Cashew Nut Shell Liquid (CNSL) – that is in the shell of the raw cashew nut – can enter the kernel.



Before bagging, remove any foreign matter and discard immature, diseased, shrivelled and damaged nuts. As soon as the nuts are dry, they should be stored and protected from rain.

d) Demonstrate the appropriate use of tools for drying raw cashew nuts



The following tools are used for drying raw cashew nuts:

The drying floors are always outside, on **specialty-laid concrete floors** or **tarpaulins**. The drying floors are set up in an area with shade or under sunlight, depending on the weather conditions in your area.

The following tools and materials are required for drying:

- **Tarpaulins** are spread out on a flat surface



Source: https://www.msquaredphotog.com/index.php?main_page=product_info&products_id=2620

Use **Rakes** or **Plastic Containers** to turn the raw cashew nuts every two hours to ensure uniform drying. Dried nuts make a rattling sound while turning.

- **Rake**



Source: <https://www.krafttool.com/GG871>

- **Plastic Container**



Source: <https://www.about-tea.de/authentic-big-bin-container-storage-box-yellow-plastic-1210074-EN>

You can also check the moisture content of raw cashew nuts by taking different samples in your hand and shaking them. Dried nuts make a rattling sound while shaking.



Source: GIZ/ComCashew – Checking moisture content of RCN manually during drying

e) Outline the procedure for drying raw cashew nut

Use the checklist to follow steps 1 to 9 in drying raw cashew nuts. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rate
1. Find a dry, even and shaded or lightly sunny ground	
2. Spread tarpaulin on the ground or dry the raw cashew nuts on concrete floors	
3. Pour undried raw cashew nuts on the drying ground evenly (60 kg/m ² and not thicker than 10 cm)	
4. Turn raw cashew nuts frequently (every 2 hours) to ensure uniform drying	
5. Heap nuts together in the evenings and cover them with a tarpaulin or palm leaves as a protection against rain, animals and thieves	
6. Uncover and spread the nuts in the morning to continue drying	
7. Test moisture content after 3 days	
8. Raw cashew nuts are ready for bagging when the moisture content in the nut is 9 % and below. As you shake the raw cashew nuts, they make a rattling sound when they are dry	
9. Remove any foreign matter and discard immature, diseased, shrivelled and damaged nuts	

Never give up. Great things take time. Be patient.

f) **Dry raw cashew nut for storage**



Practical Exercise: Go to the processing factory or warehouse for your apprenticeship and dry raw cashew nuts.



Source: GIZ/ComCashew – Farmers drying RCN



SELF ASSESSMENT

1. Explain the importance of drying raw cashew nut for storage.

2. State the factors to consider in drying raw cashew nut for storage.

3. Identify the methods for drying raw cashew nut for storage.

4. Outline the procedure for drying raw cashew nut.



Well done! One step at a time. You are doing great on your path to become a cashew expert.

3. DEMONSTRATE SKILLS FOR GRADING RAW CASHEW NUT

a) Explain raw cashew nut grading

Grading raw cashew nuts is also referred to as calibration.

Calibration takes place in the processing factory after drying and is the process of grouping raw cashew nuts into different sizes according to their diameter. Apart from grading raw cashew nuts, the calibrator also sieves larger pieces of foreign matter and discards smaller immature, shrivelled and damaged nuts raw cashew nuts before bagging raw cashew nuts.

Once the mature raw cashew nuts are calibrated, they automatically fall into jute bags according to their calibrated sizes.



Source: GIZ/ComCashew – Calibrating raw cashew nuts and bagging in jute bags

b) State the importance of grading

Calibration of raw cashew nuts is important:

- to process only same-sized raw cashew nuts at once
- to adjust cutting blades of the manual de-shelling equipment and/or the mechanical de-shelling machines according to the size of the raw cashew nuts that are being processed
- to increase de-shelling efficiency
- to reduce breakage during de-shelling
- to assure even drying during oven treatment and facilitate grading of kernels.



If the raw cashew nuts are well-calibrated and the cutting blades are adjusted according to the size of the raw cashew nut, the processing yield is higher.



Yield in cashew processing refers to the amount of whole white kernels obtained (in grams, kg or MT) in comparison to the total amount of RCN processed.



Source: GIZ/ComCashew – Calibrated raw cashew nuts in jute bag

c) **State the factors to consider in grading**

In the calibration process, the raw cashew nuts are separated into different sizes with the help of an electric calibrator.

The five (5) most common sizes used for calibrating (grouping) raw cashew nuts are:

- 18 mm
- 20 mm
- 22 mm
- 24 mm
- more than 24 mm

After calibration, store the dried raw cashew nuts in jute bags according to the calibrated sizes with a standard net weight of 80 kg per bag.

Fill raw cashew nuts in jute bags to allow adequate ventilation of the nuts and to prevent build-up of moisture during storage, which can result in infestation of the raw cashew nuts.



Do not use plastic or fertilizer bags to store raw cashew nuts! The only appropriate storage is in jute bags.

d) **Demonstrate the safe use of equipment for grading**



The following equipment is used for grading:

- Use an electric **Raw Cashew Nut Calibrator** to group and bag raw cashew nuts according to different sizes in **Jute Bags**



Source: <http://www.mekongmachine.com/product/raw-cashew-cleaning-calibration-machine/>

e) Outline the procedure for grading

Use the checklist to follow steps 1 to 6 in grading of raw cashew nuts. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rating
1. Ensure raw cashew nuts are well dried on concrete floors or tarpaulins with a maximum moisture content of 9 %	
2. Pour the dried raw cashew nuts in the calibrator and place jute bags under each hole	
3. Calibrate raw cashew nuts according to sizes: 18mm, 20mm, 22mm, 24mm and more than 24 mm	
4. When jute bags are filled up to 80 kg, close the jute bags with a needle and a nylon thread	
5. Place the next bag under the exit hole of the calibration machine	
6. Label the filled jute bags with their calibrated size and date of bagging	

It's not about being perfect. It's about trying. Believe you can do it and you are already halfway there.

f) Grade raw cashew nut



Practical Exercise: Go to the processing factory and calibrate raw cashew nuts.



SELF ASSESSMENT

1. Explain raw cashew nut grading.

2. State the importance of grading.

3. State the factors to consider in grading.

4. Outline the procedure for grading.



Congratulations! If you ever feel like giving up, just look back on how far you have come already. You are doing really great!

4. DEMONSTRATE SKILLS FOR STORING RAW CASHEW NUT

a) Explain storage of raw cashew nut

Storage of raw cashew nuts involves the systematic stacking of 80 kg jute bags, filled with raw cashew nuts on pallets in a ventilated warehouse.

Storage requirements depend on weather conditions. Raw cashew nuts are usually produced in climates with a long dry season. Thus, simple buildings with concrete floors and walls, and roofs of corrugated metal provide adequate storage.



Source: GIZ/ComCashew – Placing jute bags on wooden pallets for storage



Remember! Raw cashew nuts must be dried at a moisture content of 9 % or below, packed and sealed in jute bags for storage.



An appropriate storage system for raw cashew nuts is essential to store raw cashew nuts for 12 months or more.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
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b) State the factors to consider when storing raw cashew nut

There are ten (10) factors to consider in setting up a safe storage structure and system for storing raw cashew nuts:

1. A waterproof, dry floor
2. A firm and secure metal roof
3. Openings in the wall must be protected in order to prevent water from entering the room
4. A space of 1.5 m between the packed jute bags, the roof and the walls of the storage
5. Allow air to circulate freely
6. The store should be easy to inspect
7. Allow stacks to be moved around, if large quantities are to be stored
8. Allow sufficient space for individuals to walk around and check the condition of the stack
9. Place stacks on raised wooden platforms / pallets to prevent moisture from the floor from entering the nuts
10. Label the different stacks of products according to sourcing origin and initial date of storage



As a trader, sell your raw cashew nuts within the same year of harvest to prevent quality loss. If you store your raw cashew nuts for too long, you might run the risk of selling them at all.



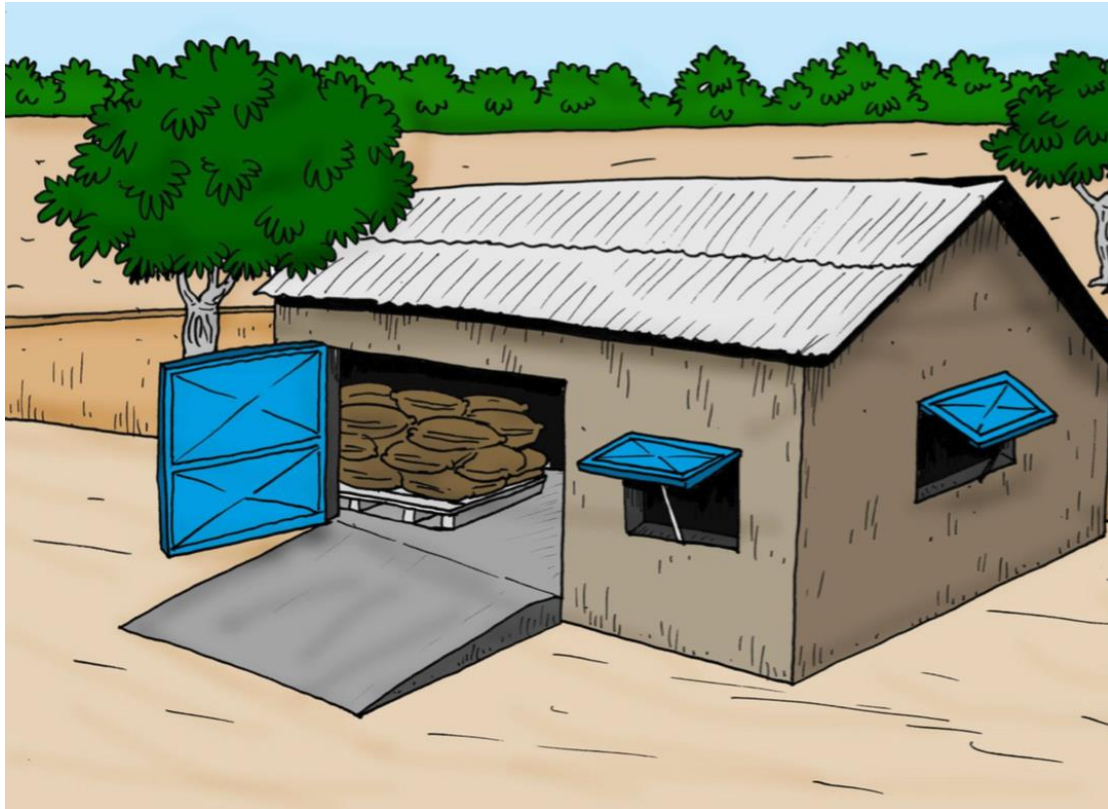
As a processor, store your raw cashew nuts until the following harvest season for processing throughout the entire year.



Source: GIZ/ComCashew – Storage of RCN in warehouse

c) Explain the methods of storing

Always store raw cashew nuts in jute bags in a dry and ventilated warehouse.



Source: GIZ/ComCashew – Warehouse for proper storage of raw cashew nuts in a community

Do not store raw cashew nuts:

- outside without protection from rain
- in a hot room
- in plastic or fertilizer bags



Infestation can also occur at various stages of handling raw cashew nuts, especially during inappropriate storage. Infestation can go undetected until the damage has progressed to the point of heavy product loss.

d) **Demonstrate use of tools, equipment and materials for storing**



The following tools and materials are required for storage:

- Use **wooden pallets** to raise jute bags off the floor to prevent moisture from the floor from entering the nuts. Arrange pallets with sufficient space from the walls, roof and other stacks to ensure ventilation.



Source: <https://www.universalpallets.com/product/4-way-entry-standard-size-conversion-pallet/>

- **Jute bags** are most appropriate for storing raw cashew nuts. Jute bags allow air to flow through. You can use former **cocoa jute bags** to store raw cashew nuts.



Source: <https://www.tvv-verpackungen.de/Jute-Saecke-H320>

- Use **Wooden Sign Boards** to label each stack according to sourcing origin and initial date of storage.



Source: <https://www.indiamart.com/proddetail/wooden-sign-board-14857621348.html>

e) Outline the procedure for storing

Use the checklist to follow steps 1 to 4 in storing raw cashew nuts. Rate your own performance critically and honestly after you have completed each activity.



Excellent



Okay



Try Again

Activities	Rate
1. Place wooden pallets on the floor	
2. Arrange pallets with 1.5 m space to the walls of the storage and a 1 m gap between the stacks as a walk way.	
3. Place jute bags on the pallets	
4. Stack jute bags not higher than 4 m to ensure stability	

Our greatest weakness is giving up. The most certain way to succeed is always to try one more time.

f) Store raw cashew nut



Practical Exercise: Go to the processing factory or warehouse and store raw cashew nuts in a ventilated warehouse.



Source: GIZ/ComCashew – Organic certified raw cashew nuts



SELF ASSESSMENT

1. Explain storage of raw cashew nut.

2. State the factors to consider when storing raw cashew nut.

3. Explain the methods of storing.

4. Outline the procedure for storing.



Bravo! You have completed this entire unit. Focus on your goal and don't look into any direction but ahead.

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