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DEUTSCHE ZUSAMMENARBEIT

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European Union

REPORT

CAMBODIAN CASHEW VALUE CHAIN ANALYSIS

December 2024

Implemented by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Published by

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn, Germany

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Project name EU-German Cambodia Partnership for Sustainable Agriculture and Food Systems (EU-German CAPSAFE)

On behalf of The European Union (EU) and German Federal Ministry for Economic Cooperation and Development (BMZ)

As of December 2024

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Photo(s) GIZ Cambodia

Foreword

Cambodia is rapidly ascending as a major player in the global cashew industry, having secured its position as the world's second-largest producer of raw cashew nuts. This achievement underscores the sector's potential to play an increasingly pivotal role in Cambodia's economic future. In alignment with the National Policy on Cashew 2022-2027, Cambodia is actively enhancing its cashew sector to bolster competitiveness. Currently, the majority of cashew nuts are exported unprocessed, primarily to neighbouring countries, presenting a significant opportunity for growth through the development of a domestic processing industry. This strategic move could add substantial value to the economy and reduce dependence on a single market.

In support of these national goals and economic development priorities, the “EU-German Cambodia Partnership for Sustainable Agriculture and Food Systems (EU-German CAPSAFE)” project, co-funded by the European Union (EU) and the Federal Ministry for Economic Cooperation and Development (BMZ), is supporting the Royal Government of Cambodia to enhance the sustainability, competitiveness, and inclusiveness of the cashew value chain. This partnership focuses on empowering smallholder farmers, agricultural cooperatives, and micro, small, and medium-sized enterprises to realize income and employment potentials along the cashew value chain.

As part of our efforts to achieve these objectives, the EU-German CAPSAFE project has conducted a comprehensive value chain analysis of the Cambodian cashew sector. This analysis is crucial for understanding the sector and identifying strategic interventions that can enhance its resilience and profitability. The findings of this analysis will serve as a valuable resource for policymakers, industry stakeholders, and researchers seeking to unlock the full potential of Cambodia's cashew industry.

I firmly believe that this report will not only guide our project's interventions but also contribute significantly to the sector's development. As you explore these insights, we appreciate your help in ensuring that any data or findings are properly referenced, using the following citation: “Cambodian Cashew Value Chain Analysis, James Fitzpatrick for EU-German CAPSAFE Project, 2024”.

I hope that this report will inspire action and collaboration among all stakeholders to build a more sustainable and prosperous future for Cambodia's cashew industry, contributing significantly to the country's socio-economic growth and prosperity.

Dr. Matthias Bickel
Head of Programme

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Acronyms, Abbreviations and Key Cashew Terms

AC	Agricultural Cooperative
ACA	African Cashew Alliance
AFI	Association of Food Industries (USA)
APEDA	Agriculture and Processed Food Products Export Development Authority (India)
ASEAN	Asian Free Trade Area
BRC	British Retail Consortium
CAC	Cashew Nut Association of Cambodia
CAD	Cash Against Documents Payment on Presentation of Shipping Documents
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CBT	Cashew Nut Board of Tanzania
CCA	Le Conseil de Coton et D'Anacarde, Cote D'Ivoire
CCF	Cambodian Cashew Federation
CFA	Currency West African Franc
Cfr	Cost and Freight (INCO Term)
CIF	Cost Insurance and Freight (INCO Term)
CNSL	Cashew Nut Shell Liquid
CNV International	Development Organization of the Dutch Trade Union CNV
ComCashew	Competitive Cashew Initiative
CSDDD	Corporate Social Due Diligence Directive (EU)
DALR	Department of Agricultural Land Resources Management
DDP	Delivered Duty Paid
DP	Documents Against Payment
EMBRAPA	Brazilian National Research Institute
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAO Stat	Food and Agriculture Organization Statistics
FDA	Food and Drug Authority
FDI	Foreign Direct Investment
FGP	Farm Gate Price
FOB	Free on Board
Food Safety	Handling, Storing and Preparing Foods in Ways to Reduce Risk to Consumers
Ft	Foot Cubic Measurement
GAP	Good Agricultural Practices
GDA	General Directorate of Agriculture
GDP	Gross Domestic Product
GHP	Good Handling Practices
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

CRAS	Strengthening the Climate Resilience of Agricultural Systems
GMP	Good Manufacturing Practices
Ha	Hectare
HACCP	Hazard Analysis and Critical Control Points
HARCP	Hazard Analysis and Risk Based Preventive Controls
IAP	Industry Action Plan
ICAR	Indian Directorate of Cashew Research
IFC	International Finance Corporation
ILO	International Labour Organisation
INC	International Nut Council
ITC	International Trade Centre
ISO	International Standards Organisation
JICA	Japan International Cooperation Agency
Kg.	Kilogram
KPI	Key Performance Indicators
Km	Kilometres
Lb.	Imperial Pounds
m	Million
MAFF	Ministry of Agriculture, Forestry and Fisheries
Mts	Metric Tonnes
NGO	Non-Governmental Organization
Outturn yield	Kernels Weight or Percentage Produced From an 80 Kg Sack Of RCN
QMS	Quality Management System
RCN	Raw Cashew Nut (Inshell Cashew Nuts)
R&D	Research and Development
SME	Small and Medium Enterprise
SPS	Sanitary and Phytosanitary
T	Tonnes
TEU	20 Foot Equivalent Unit (Standard Shipping Container)
UN COMMTRADE	United Nations International Trade Database
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
US	United States of America
US$	United States Dollar
VAT	Value Added Tax
VINACAS	Vietnam Cashew Association
WCC	World Cashew Conference
WRS	Warehouse Receipt System
Y	Year

Some Cashew Terms Used

Term	Explanation
Conventional	Food produced without organic or fair-trade certification
Fair-trade	“The Fair-trade system is about trading as directly as possible with producer organisations and Fair-trade standards. These standards guarantee fair and sustainable terms of trade for producers in developing countries” Fair-trade Trade Foundation.
In-shell	Nuts as harvested prior processing
Kernels	Shelled cashew nuts
KOR	Term used in West Africa “kernels outturn ratio” inaccurately to describe the results of a cutting test which does not describe the actual kernels outturn ratio. KOR properly used is the combination of outturn and grade yield.
Organic	Production system which excludes the use of chemicals and promotes environmentally sustainable methods
Outturn	Cashews – weight of kernels produced from a unit of in-shell nuts usually quoted in lbs. per 80 kg bag also in percentages. Usually used in the context of the cutting test rather than the actual outturn for a processor.
RCN	Raw Cashew Nuts (the cashew in its shell). The term “raw” is used as it describes the nuts before cooking and is an anachronism. RCN can be dried usually moisture <9% or “undried” usually at the farm with moisture >9% in the range 15-20%.
Roaster	Processor and packer of cashew kernels for retail or wholesale trade. The term is broadly used to describe all buyers that supply the snack trade with roasted (and salted) cashew kernels.
(Primary) Processing	The manufacturing process that removes the outer shell of inshell nuts, peeling to remove the testa, grading of the resulting cashew kernels and packing for sale.
Secondary Processing	Processing of cashew kernels for consumption e.g. flavouring, roasting.
Testa	The covering of the cashew kernels inside the shell.
Grade yield	Used to describe the grades of kernels produced. There are up to 36 grades.

1. Summary of Findings

The key issue for the Cambodian cashew sector in the immediate future is how to deal with production success. The growth in Cambodian production has fundamentally impacted the Global supply/demand balance creating conditions that will challenge the sector and potentially jeopardise cashew farm family income. Production success has not, so far, been accompanied by post-harvest value addition either in raw material handling or significant processing. Cambodia's post-harvest cashew infrastructure is effectively based in a neighbouring country on which Cambodia depended as an outlet for approximately 97% of its production in 2024. This is not surprising in the context of rapid production growth but needs to change in order to mitigate the market risk and to ensure that the sector is resilient at a time when the impact of climate change is becoming clearer.

Cambodia's rise to become the second largest cashew producer in the World has been meteoric. Production has increased from approximately 50,000 tonnes inshell in 2014 to 840,0000 tonnes in 2024. It is likely to reach 1 m tonnes per annum from 2028 onwards based on forecasts prepared for this analysis. Such growth in a short period of time has never happened anywhere before and is highly unlikely to be repeated at any time in the future.

The success of Cambodian production is not only measured in tonnes produced. Cambodia is also among the leaders for nut quality and on-farm production yield per hectare. Cambodian grown cashews are, on average across the crop, the largest in the World. The kernel taste and colour are good. Its processing characteristics are suitable for modern processing with good peeling characteristics and low breakage.

Average on-farm production yields in Cambodia are the highest in the World at an average of 1.42 tonnes per hectare. The rise in production is based on the development and availability of new high yielding varieties, mainly the M23 variety that accounts for 70-95% of trees in the major producing provinces of Kampong Thom, Kampong Cham, Kratie, Stung Treng and Preah Vihear. Tree density, varietal choice, planting material used and the harvesting method as well as climate and soil types all comply with the general recommendations. There is a high use of chemical inputs as fertilizer and for pest control. The regulation and training in the use of these inputs is emerging as a concern as chemical residues are increasingly regulated in destination markets where maximum residue levels are being reduced. It is also a concern that many smallholders only grow cashews in monoculture systems. This overly exposes them to the risks of the price volatility of the cashew market and to the impact of climate change on cashew yields. Both are likely to increase in the coming years.

The primary market for Cambodian cashews is the export of RCN by road to Vietnam. The trade is handled by a network of traders operating on thin profit margins. Unlike any other country, the export of RCN is in an undried format mainly in unsuitable packing material. Prices at the farm gate have held up well compared to other countries but can be expected to be volatile in the future. Cambodian cashew farmers are almost entirely dependent on Vietnamese traders and processors who increasingly operate on tight profit margins.

There is little opportunity to diversify markets based on the export of RCN. The only alternative market is India which is at a significant cost disadvantage and is unlikely to demand the large nuts produced in Cambodia. Market diversification and risk mitigation therefore depend on the development of value addition processes. Cambodian processing has made enough progress to give confidence in the long-term future of the sector. Cashew processing remains at a

relatively low proportion of the crop but existing processing capacity, if utilised for actual processed volume, would rank Cambodia in the top ten processing countries. There are several challenges in the development of processing related to post-harvest handling systems and infrastructure, supply chain development and integration, financial services and marketing.

The Cambodian cashew production model of high inputs, high yield and high quality is exposed to volatile markets and lack of market diversification. Costs are higher than in other producing countries but offset, for the export of RCN, by location, yield and the quality of the cashews produced but with significant market risk. In order to build on the success of production, the Cambodian cashew sector must develop an integrated supply chain characterised by investment in processing, excellence in management and marketing, with diversified markets offering secure incomes to smallholder families that produce cashews suitable for high value markets in a climate change resilient way.

The potential of the Cambodian cashew value chain is high. Based on a calculation of current values and forecasting based on the current market and sector trends the Cambodian cashew sector could increase its value from a calculated US$ 1.034 billion in 2024 to US$ 1.642 billion by 2030 and US$ 1.989 by 2035. The increased value would be split almost equally between production and value addition. Production through increased production and post-harvest value addition would contribute US$ 468 million and value addition, based on 70% processing of the crop, would contribute US$ 478 million. The balance would be contributed by the services needed to make the sector thrive.

In terms of employment, processing 70% of the 2024 crop would create 26,460 – 38,220 direct jobs depending on the processing method used. If the entire crop were processed up to 52,500 direct jobs could be created.

2. Introduction and Methodology

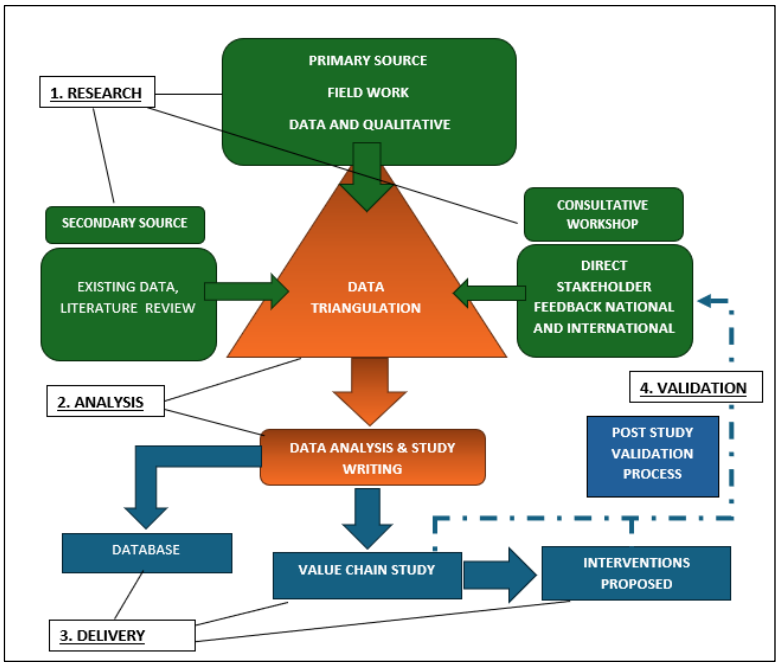
2.1 Methodology and Process

This analysis focuses on identifying and justifying a set of proposed upgrades or interventions for the Cambodian cashew sector. It is data analysis and interpretation driven. It assesses practice and performance in Cambodia compared to other cashew producing countries with a view to identifying the potential for increased value addition, greater contribution to economic growth and the related environmental risks and benefits.

The analysis is based on a triangulation of primary source data from field research interviews, a review of the existing literature and a validation process that included a consultative workshop during which the findings were presented to a wide range of stakeholders including producers, cooperatives, trade associations, processors, NGOs and representatives of the Ministry of Agriculture, Forestry and Fisheries and the Ministry of Commerce. During the consultative workshop the findings were largely accepted by actors and their feedback was used to improve and augment the first draft of the analysis.

This process was designed and used as it was 1. recognised at the outset that the available data on the sector is often incomplete or contradictory and 2. the resources available were limited especially the key resource, time, as the research, analysis and validation work had to be completed within a three-month period from October to December 2024.

FIGURE 2.1 RESEARCH AND VALIDATION PROCESS



The research, analysis and validation process followed a detailed planning and preparation phase during which the task was defined, and consultants were selected and trained to conduct the research as outlined in Figure 2.2.

To support the interview-based field research series of tools for consultants were prepared. These included interview questionnaires for different types of actor and reporting templates. The research questions were defined to ensure a consistent gathering of similar information from relevant stakeholders across the provinces. Contacts lists were compiled using data from previous projects carried out by EU-German CAPSAFE, GIZ CRAS and the international consultant. A list of cashew agricultural cooperatives was incorporated into the listing. These were updated and expanded by the individual consultants and shared with the team using online file sharing services.

The tools were discussed in detail during the training and shared with each consultant for use in the actual interview situations. The training and tools were summarised in a reference guide named “Consultant Information Pack”. A series of targets that defined the number and distribution by type of actor were defined and agreed with the consultants. The templates were identical for each province, but the distribution of stakeholders differed depending on the activities in each province. This method was used to ensure consistency across the interview process and to streamline the compilation of the data gathered for the analysis work. This analysis is not intended to serve as a sector census or detailed statistical account of the sector but its findings have been found to be in line with some of the recent work such as the cashew mapping exercises undertaken by the Ministry of Agriculture, Forestry and Fisheries.

FIGURE 2-2 PREPARATION, RESEARCH AND ANALYSIS PROCESS

2.2 Field Research

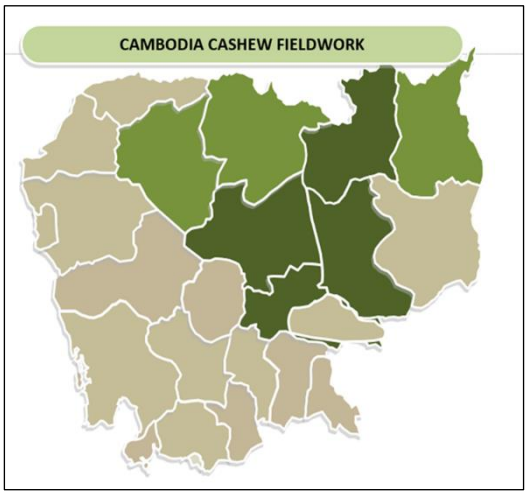
The field research for the analysis was conducted by five Cambodian consultants, an international consultant and a member of the EU-German CAPSAFE team. Research took place in seven provinces covering approximately 87% of the area of the country planted to cashew nuts and 86% of the total production of cashew nuts inshell. During the research 286 people were interviewed or consulted mainly in an in-person interview process. The international interview process of 21 interviews mainly took place online. The interviews took place during October – Mid-November 2024. The consultative and validation process took place during December 2024.

A high majority of interviewees were cooperative and prepared to answer questions openly. Targets were met for most actor groups with the exception being the category “Traders” where there was more reluctance, and the interview numbers fell below the target of 20% share of interviews. There were some key aspects of questioning where reluctance was expected including profit margins and costs but for the most part the consultants and the interviewees surpassed the expectations for the confidential and potentially commercially sensitive information. All interviewers were assured that their interviews would remain confidential, would only be used for the analysis and presented as part of the broad picture without disclosure of the source of the information. Some direct quotations from interviewees have been used with their specific permission.

The cooperation, generosity and knowledge of the interviewees and the diligence of the consultants in conducting the interviews is acknowledged and recognised as a positive indicator for the future cohesion and growth of the Cambodian cashew sector.

FIGURE 2-3 FIELD RESEARCH DASHBOARD

	Research Consultant	Research Province/Region
1	Vichea TAN	Siem Reap province
2	Bros Peou CHHEAN	Kratie province
3	Keb THY	Kampong Cham province
4	Lay Heng DANG	Stung Treng province
5	Savong TUY	Preah Vihear and Ratanakiri province
6	Pengkun KEAT	Kampong Thom province
7	Jim FITZPATRICK	International

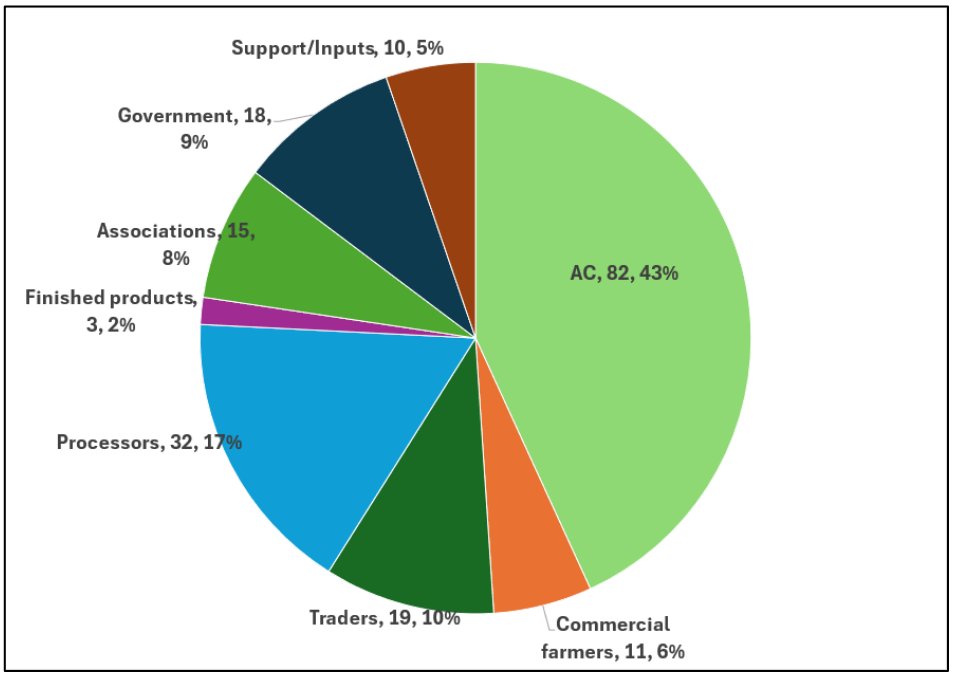


The four largest producing provinces were selected for a full actor interview process. Preah Vihear, Ratanakiri and Siem Reap were selected for a lighter process due to the lower number of actors in those provinces and in order to make best use of the available resources. This allowed 87% coverage of the planted area, and 86% coverage of the volume produced.

Coverage	
By area planted	**87%**
By volume produced	**86%**

People interviewed: 286. Organisations Interviewed: 190.

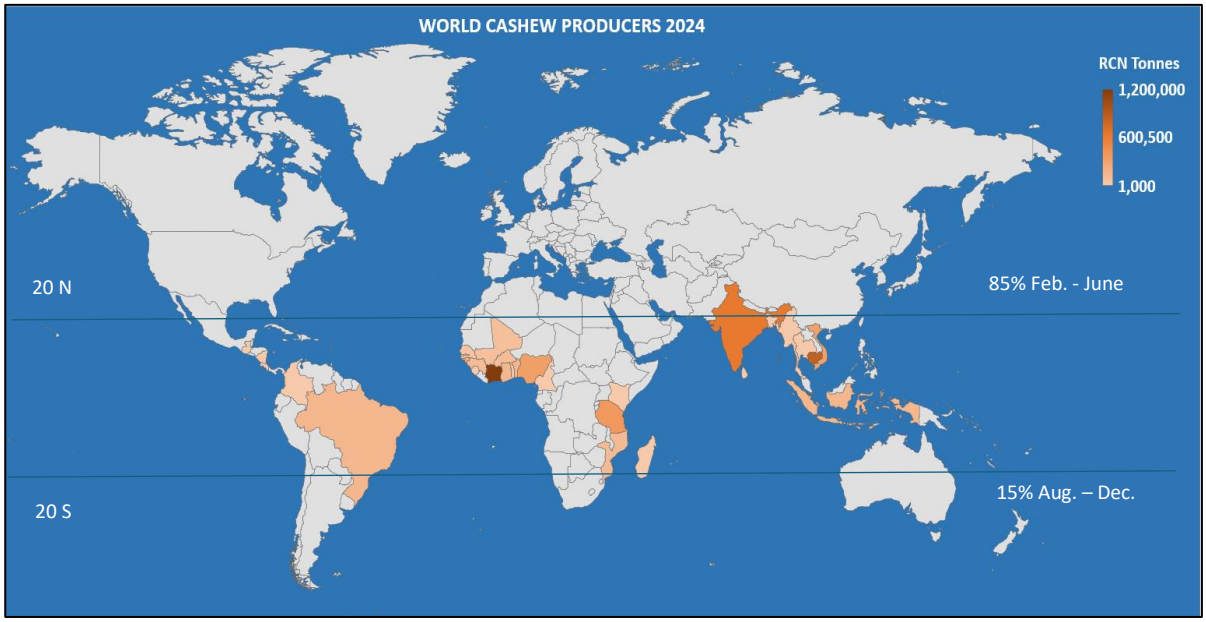
NUMBER AND PERCENTAGE OF ACTORS INTERVIEWED



3. The World Cashew Market – Situation and Trends

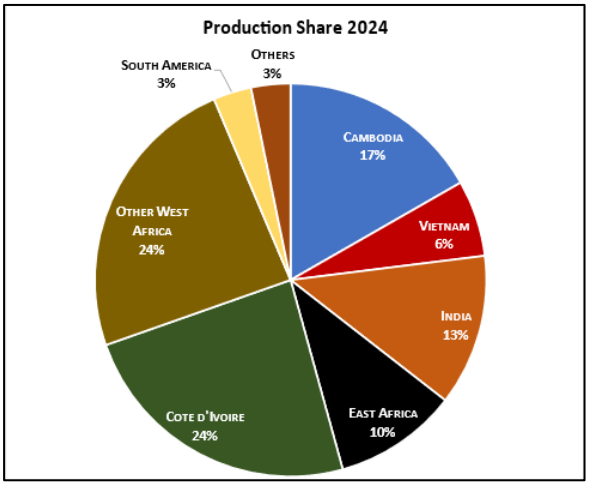
3.1 Production Trends

FIGURE 3-1 WORLD CASHEW PRODUCTION REGIONS - SOURCE DATABASE COMPILED FOR THIS STUDY



Cashew nuts are grown in volumes suitable for commercialisation in twenty-four countries and in many more in smaller quantities. Production is concentrated in four regions. West Africa produced 48% of the Worlds cashew in 2024. Cambodia and Vietnam combined produced 20%. India produced 13% of the Worlds cashews and East Africa produced 10%.

FIGURE 3-2 CASHEW PRODUCTION REGIONAL SHARE.



Cashew trees are cultivated in a band between twenty degrees north and south of the equator.

The northern harvest season is from February-June (85%) and the southern harvest season is from August to December (15%). They are intolerant of low temperatures and are relatively resistant to drought although low moisture conditions will reduce the yield of nuts and fruit. Cashews are often grown on low quality or marginal land having been introduced as a protection against soil erosion in many of today's major producers. They can be grown with low maintenance, as in West Africa, or with higher use of inputs and good tree management as in Cambodia and Vietnam.

The cultivation methods, soil, tree density and varieties grown impact yield significantly. Yields vary widely across the growing regions. Based on calculations and literature assessed for this analysis, yields in West Africa range from 300-700 kgs per hectare[1] and in India the average

[1] African Cashew Alliance Cashew Barometer www.africancashewalliance.org

national yield is estimated at 750-800 kgs per hectare[2]. The highest yields per hectare are found in Cambodia and Vietnam where research and fieldwork for this analysis indicates that broadly yields range from 1250 – 2000 kgs per hectare in Cambodia (MAFF average 2023 1420 kgs) and 700-1400 kgs per hectare in Vietnam. There are examples as high as 2500 kgs per hectare in both countries.

The vast majority of cashews are grown by smallholders on holdings of less than 5 hectares usually as part of a subsistence agriculture system. There are an estimated 5 million cashew farmers worldwide. Cashews are important to the family smallholder economy mainly as a cash crop that provides income for annual expenses such as education or debt repayment. They are regarded as easy to grow requiring low maintenance and inputs compared to other crops. Production entry is seen as easy and low cost. Extension has generally been on low quality land using local seeds. This is in marked contrast to the development of production in Cambodia where high-quality seedlings for high yielding varieties dominate. Monoculture of cashews is rare at smallholder level although fieldwork for this study indicates that it is more likely to be found in Cambodia than anywhere else. Large scale commercial production is unusual except for Brazil. There are examples of larger family farms of 10-50 hectares size in Cambodia and elsewhere as well as a few commercial farms up to 150 hectares area. Globally, the lack of mechanised harvesting technology, low yields and historically low farm gate prices have mitigated against the development of commercial farming of cashews.[3]

Low maintenance and low use of inputs in major producing countries has meant that the increase in cashew production has been primarily driven by the extension of the planted area i.e. planting more trees. Production grew in the ten years up to 2024 at a CAGR[4] of 5.1%. In 2021 World production exceeded 5 million tonnes inshell basis for the first time. Until 2020 the region driving production growth was West Africa with a CAGR of 5.7%. During this period production in India grew slowly at a rate of less than 2% per annum. It contracted in Vietnam by approximately 1%.

From 2021 onwards the primary driver of production growth has been Cambodia with a 5-year CAGR of 27%[5]. This period saw trees that had been planted 3-5 years earlier start to produce. World production growth in the five years 2020-2024 grew at 6% per annum as poor crops in West Africa and India offset gains in Cambodia especially in 2024. Production is likely to reach new heights in 2025 given good growing conditions in Africa and India and continued increase in Cambodia.

[2] Directorate of Cashewnut and Cocoa Development www.dccd.gov.in.
[3] Authors view based on research for private commercial plantation projects.
[4] Compound Annual Growth Rate.
[5] Calculations based on MAFF production estimates – see below.

Figure 3-3 WORLD CASHEW PRODUCTION

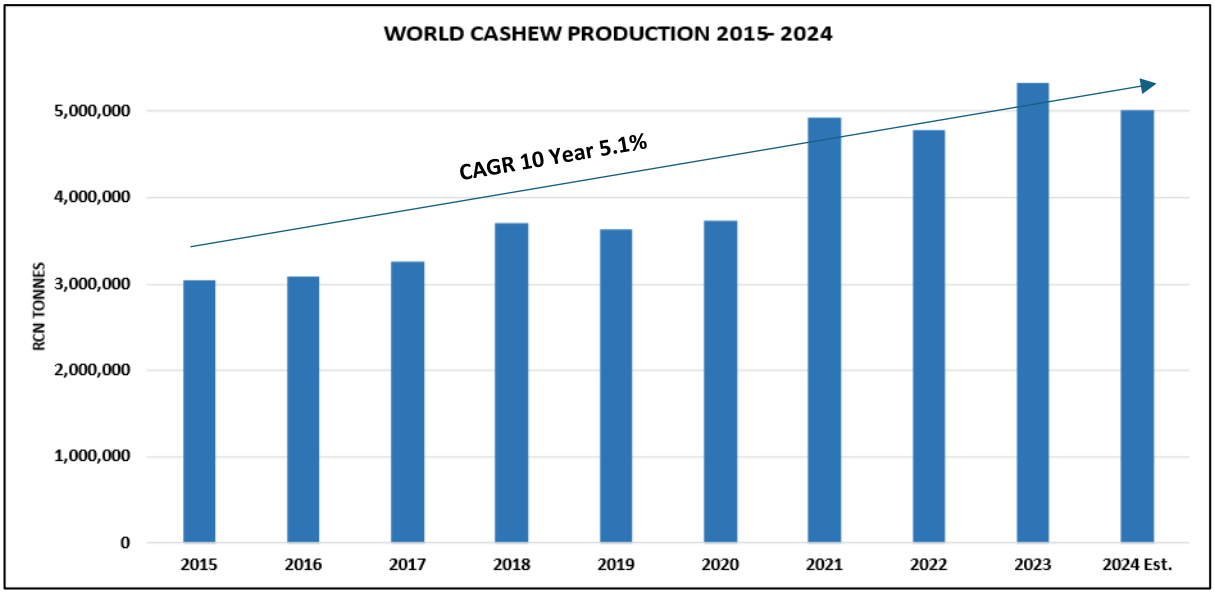
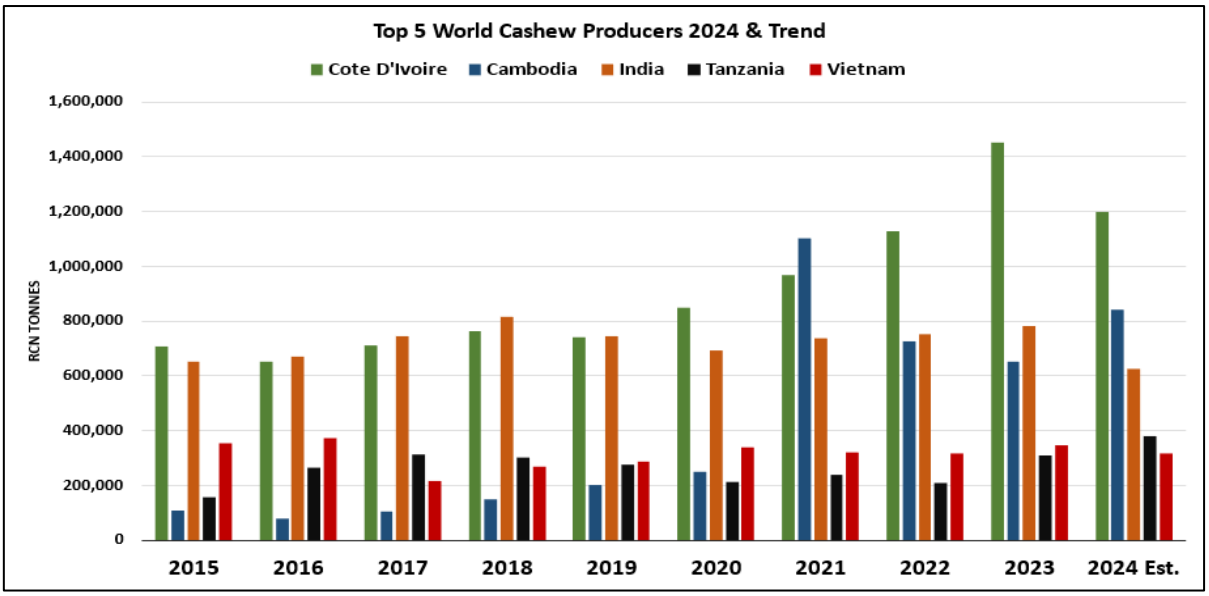


Figure 3.4 below shows the growth in cashew production in the top five producing countries. Cote d'Ivoire showed strong growth until 2024 when weather conditions impacted the crop. After its initial surge in 2021 Cambodia has shown steady growth. The other major producers have shown relatively slow growth. Indian production has been impacted by poor weather particularly in 2024 when very dry conditions persisted during flowering according to APEDA. Tanzania may be entering a period of faster growth according to first hand reports from the Cashew Board of Tanzania. This is due to a better inputs distribution system to combat fungal diseases and reform of the national inshell auction system that has improved prices received by farmers.

Note: Questions have been raised with regard to the 2021 cashew production in Cambodia notably during discussions at the World Cashew Conference at Siem Reap in February 2024. The production figures used is the estimate of MAFF and CAC. This figure is in line with Vietnams imports statistics. The difficulty arises as the figure appears to be out of line with the trend. There was no statistical evidence found that the figure is incorrect but anecdotal evidence suggest that it may be too high.

FIGURE 3-4 CASHEW PRODUCTION TREND IN THE TOP FIVE PRODUCING COUNTRIES

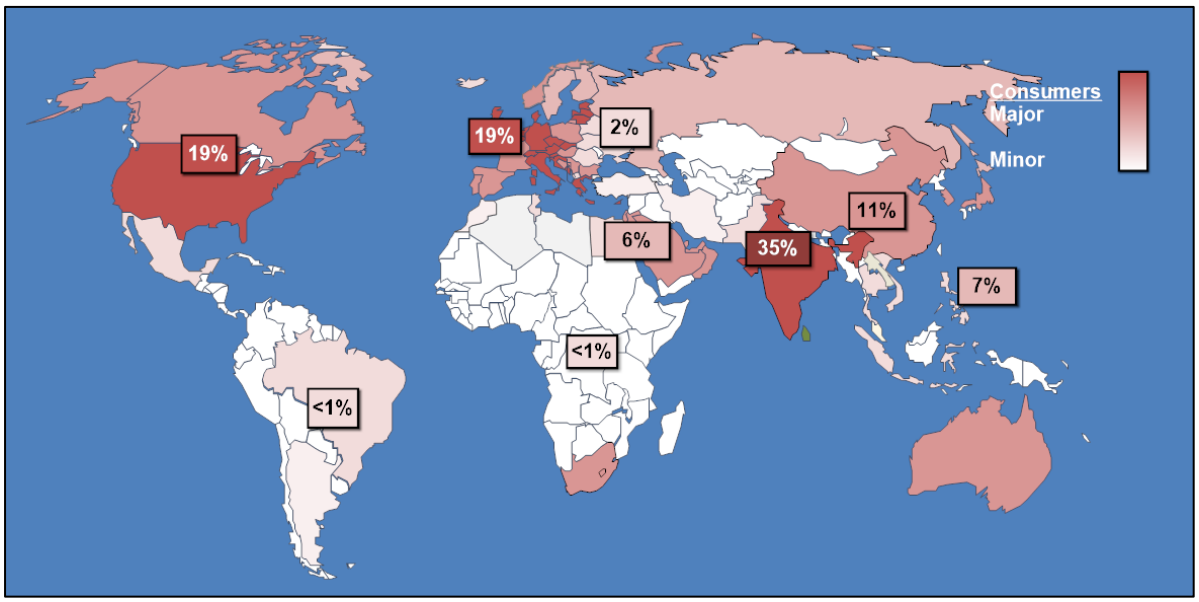


Key points:

- Cashew production is growing at 5-6% per annum.
- Growth is expected to continue with some volatility due to weather and climate change.
- West Africa drove cashew production increase up to 2020 after which Cambodia became the main driver.
- Cashews are growth by smallholders with low yields per hectare.
- Improved varieties, use of inputs and good on farm management mean that Cambodia and Vietnam have higher yields per hectare than found elsewhere.

3.2 Consumption, Demand, Supply/Demand Balance and Forecast

FIGURE 3-5 WORLD CASHEW CONSUMERS 2023



Cashew are consumed after shelling and grading as cashew kernels. Consumption is mainly in the form of snacks e.g. roasted and salted nuts with about 20% consumed in the form of ingredients and processed products. This is different in India where snack usage is less than 30% and uses in sweets, bakery and cooking more common. Worldwide, diversification of applications e.g. cashew milk or cashew butter remain very small market segments with potential for growth.

India (35%), Western Europe (19%) and North America (19%) account for 73% of the world consumption. China is a country of fast-growing consumption and accounted for 11% in 2023. West Asia, primarily the countries of the Gulf of Arabia, accounts for 6% of consumption. In all the major consuming regions except India cashew kernels are imported. In India inshell (known as raw cashew nuts - RCN) are imported to augment the national crop and processed for consumption. Consumption in producing countries in Africa is negligible in the global context and low in Cambodia and Vietnam.

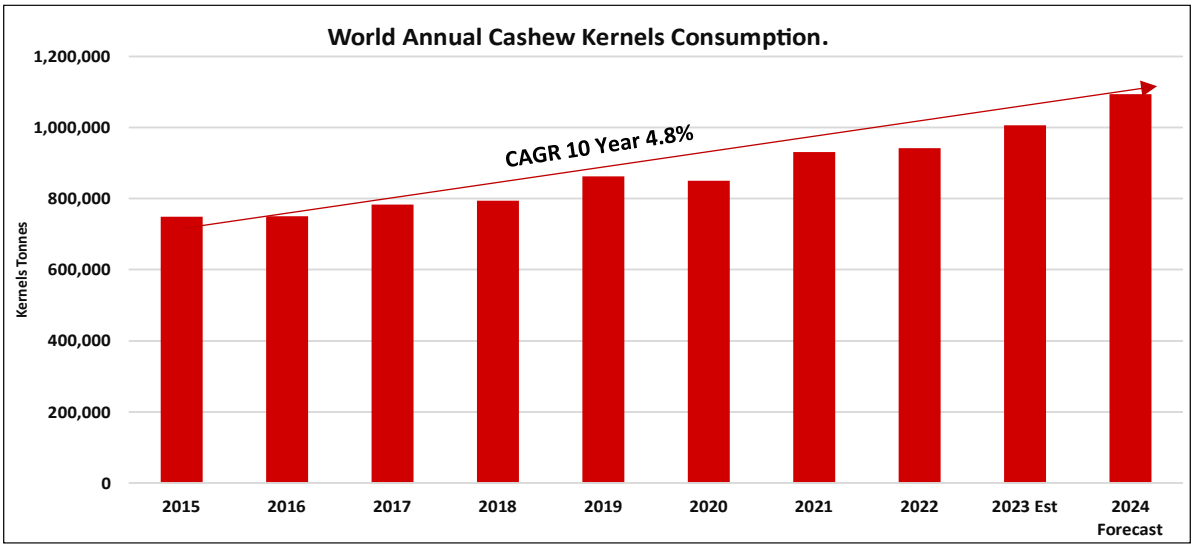
Vietnam dominates the international market for cashew kernels. In 2023, Vietnamese processed cashew nuts had a 74% share of the Western European market[6], an 89% share of the US market[7], an estimated 60% share of the West Asia[8] market and a 95%+ share of the Chinese market[9]. In order to achieve this level of market dominance Vietnam imports more than 80% of its raw material from Cambodia, Africa and Indonesia as outlined in the next section.

Based on international trade figures World consumption of cashew kernels has grown at a CAGR of 4.8%[10] over the ten years up to 2024 (Forecast November 2024). Growth has been driven by two aspects. In India by increasing affluence and population growth as the country already had a high level of usage and deep penetration of cashews as part of Indian cuisine. Elsewhere consumption growth has been driven by trends in snacking, convenience and, in the past decade, healthy eating trends.

Recent trends toward reduced meat consumption leading to more demand for plant-based protein, vegetarian eating and conscience driven consumption focussed on environmental sustainability have been most impactful in the EU market and to a lesser extent in North America. Cashews are seen by many consumers and promoted by manufacturers as a healthy snack with a lower carbon footprint than animal-based protein sources. However, taste, quality and texture remain the key factors for the majority of consumers.[11]

[6] Eurostat.
[7] US International Trade Commission database https://dataweb.usitc.gov/
[8] UNCommTrade
[9] Vietnam Customs Authority https://www.customs.gov.vn/
[10] UNCommTrade figures analysed for this study.
[11] World Cashew Conference presentation Wim Schipper, Intersnack (Europe's largest snack processor)

FIGURE 3-6 TREND IN WORLD CASHEW KERNELS CONSUMPTION



3.2.1 Balance of Supply and Demand

Until 2020 the supply and demand for cashew nut kernels was closely matched. Supply and demand grew at similar rates. Tight supply situations or the perception of tight supply situations for example in 2016 and 2017 led to higher prices. Improved production tended to correct the high prices e.g. in 2018 after the price escalation of 2016-2017. The market was characterised for many years by periods of high price volatility followed by more stable periods during which demand tended to grow steadily. Long term cashew demand grew steadily for more than 30 years until 2011 when the impact of the financial crisis interrupted the trend for a year. During periods of high prices farmers tend to plant more cashew trees and/or to care better for existing trees which increases production in the following years.

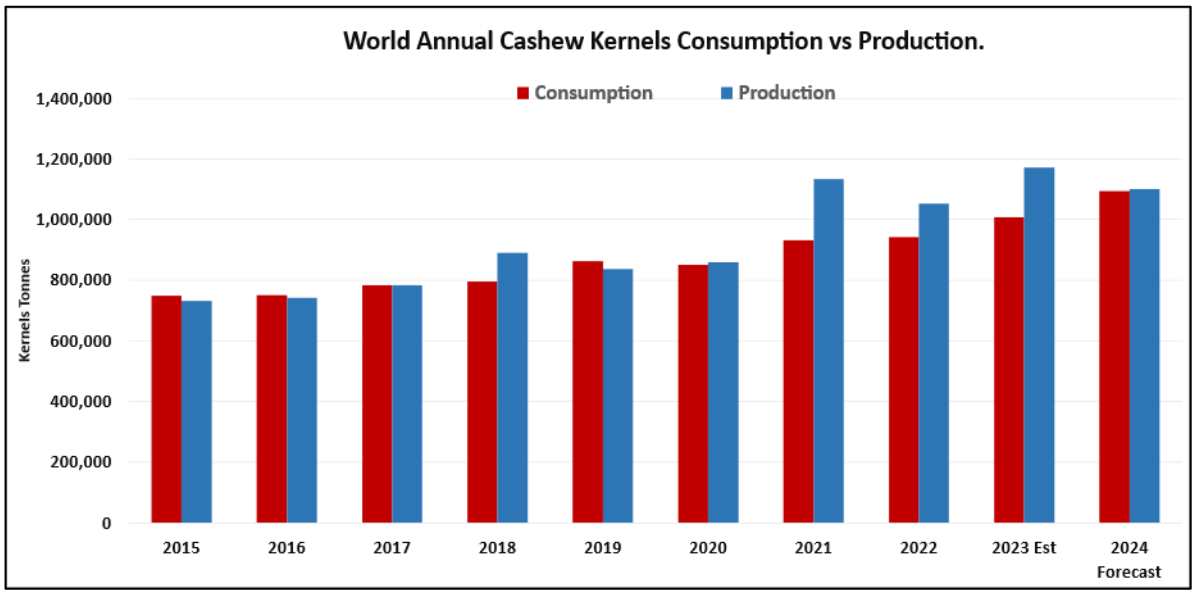
The balance changed in 2021 due to a sharp rise in production that caused the market to enter a period of surplus production and lower prices as a result. Well matched balance of supply, based on West African growth, and demand was unbalanced by the sharp rise in Cambodian production. From 2021 the supply/demand balance has been in an oversupply situation.

The cashew trees planted in Cambodia during 2015-2018 were planted in a period of record high prices. They matured from 2019 onwards. The impact was somewhat subdued due to the COVID-19 pandemic in 2020 which slowed harvesting and shipments in Africa. It was also less impactful in 2021 as there was a surge in demand in Western countries due to the impact of COVID-19 lockdowns and restrictions on public events. Many international actors had been aware that Cambodian production was likely to increase but few appreciated the scale of the impact of high yielding varieties and more efficient production methods than found elsewhere. The production increase impacted the market during the second half of 2022 when demand also slowed due to energy and food inflation in key markets. International cashew prices fell sharply and remained at 14-year lows for more than a year from May 2023.

In 2024 this situation was somewhat rebalanced by a poor crop in West Africa and India due to weather conditions during flowering. The market absorbed high carry-in inventories from

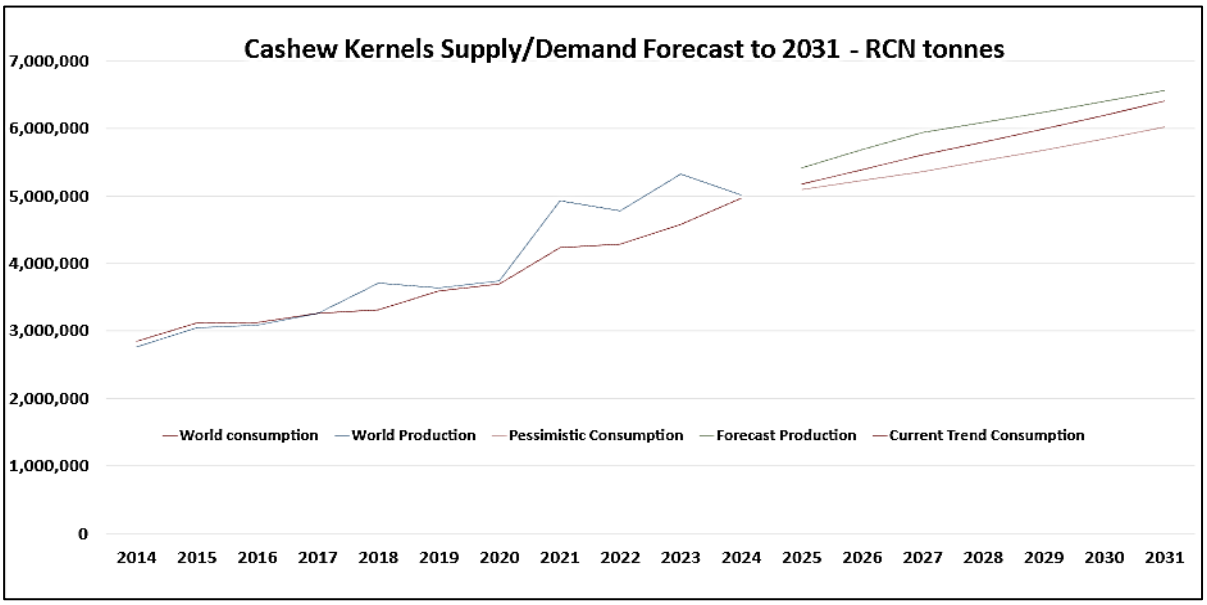
earlier years. Cashew prices recovered with an increase of 36%[12] on the benchmark grade of WW320 lifting it close to historical averages.

FIGURE 3-7 CASHEW KERNELS SUPPLY AND DEMAND TREND



The lower crop coincided with much improved demand. This was stimulated by a range of factors including the lower prices of the previous two seasons, easing of inflation in the US and EU and strong demand growth in China as well as the underlying strong demand trends mentioned above. However, a normal crop in 2025 would be likely to return the balance to a surplus supply position.

FIGURE 3-8 FORECAST CASHEW PRODUCTION AND DEMAND



[12] November 2024.

Figure 3.8 projects future demand and supply. The production projection is based on the current tree stock coming to maturity, continued average yields and average growing conditions. There are two consumption trends projected. Firstly, a continuation of the current 10-year trend and secondly, a "pessimistic" trend that assumes slower growth as an impact of higher cashew kernels prices.

Looking further forwards to 2031 [13] current trends suggest that the surplus position is likely to persist in normal growing conditions producing normal crops if demand returns to pre-2024 growth trends of 4.8% per annum as outlined in Figure 3-8 under the "Current Trend Consumption" assumption. The surplus will be relatively minor, circa 2.5%, in this event and is likely to keep cashew prices stable. The pessimistic scenario assumes slow growth in 2025-2027 in all markets except China[14] in a range of 2-3% and an increase from 2028 to a range of 3-5%. It would cause a surplus of circa 8% to emerge that could slow production growth and could cause prices to fall. However, it should be noted that in the past cashew kernels prices have been remarkably resilient as demand responds to underlying consumption trends as well as price factors. Prices at the farm gate for inshell cashew nuts have not fared so well in the past and have tended to react more quickly to surplus production.

These scenarios do not take into account the impact of the normal fluctuations in growing conditions that are likely to be accentuated by climate change. There are likely to be more instances of poor growing conditions and therefore the trends are more likely to be interrupted by production problems.

It is unlikely that the production surge in Cambodia that impacted from 2021 onwards will be repeated as there is a very low probability of the kind of high prices last seen in 2017 being repeated. This is confirmed by the fieldwork undertaken for this study. African cashew production is growing steadily but growth is unlikely to exceed the rates of the past decade. Worldwide it is more likely that growth will trend toward the long-term pattern. This would mean that after 2031 the surplus position would be eroded, and the market would return to a balanced situation. However, crop failures in any given year in any two major producers could cause very high prices and further stimulate production growth.

Key points:

- Consumption of cashew nuts has been growing for many years with minor interruptions at an average rate of 4.81%.
- Current trends indicate that the supply/demand balance will return to a surplus situation assuming a normal crop in 2025 and thereafter for the near future.
- Current demand trends indicate a return to more usual demand growth rates from 2025.
- Production growth based on the surge in Cambodia is unlikely to be repeated.
- Therefore in "normal" production conditions the market will trade from a minor surplus position with fluctuations due to growing conditions in individual years.

[13] i.e. the year when a cashew tree planted in 2024 would reach production maturity.
[14] Chinas growth is assumed at 5% per annum as the underlying factors are related to an early stage market with low per capita consumption and a move toward more consumption of edible nuts.

3.3 International Trade in RCN and Cashew Kernels

The trade in RCN has been the fastest growing trade segment over the past ten years with growth of 10% per annum. This has been due to the increase in production and consumption and the location of the majority of cashew processing units in Vietnam and India. This trade has grown despite the increase in African cashew processing over the past decade. Vietnam imported 2.77 million tonnes of RCN in 2023 with value in excess of US$ 3.2 billion. India imported 1.81 million tonnes in the same period with a value of approximately US$ 1.34 billion.

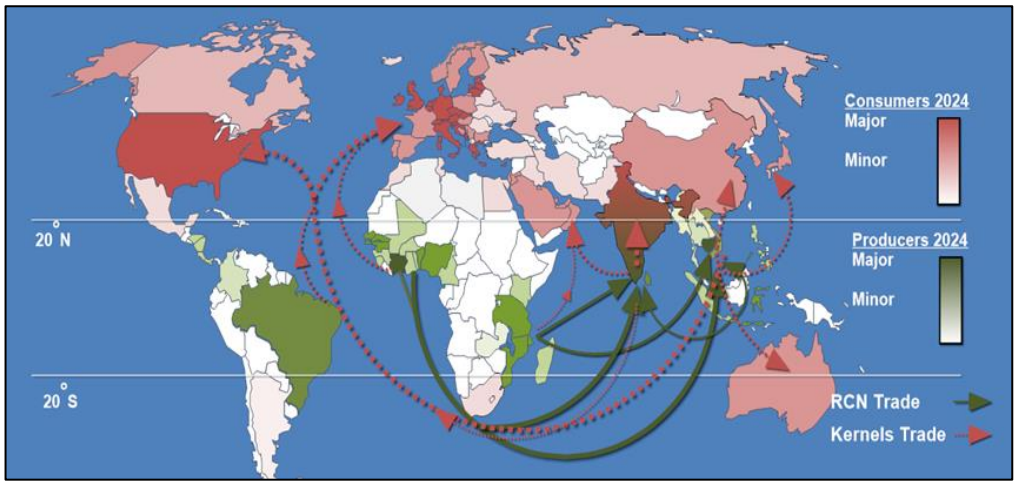
Fast growth in this channel includes the growth of Vietnam's imports from Cambodia by road from 176,000 tonne in 2019 to 614,000 tonnes in 2023 and 824,000 tonnes in 2024 up to the end of October.[15] Figure 4.9 shows the main channels for RCN trade. The main channels to Vietnam are by road from Cambodia (22% in 2023 and 37% in 2024-October) and West Africa to Vietnam (72% in 2023). India buys most of its RCN from West Africa with a share of 90% in 2023 and East Africa with a share of 9% in 2023.

The international trade in RCN is handled by a network of international traders often based in Singapore, Dubai or Hong Kong and domestic exporters in each producing country. It is primarily financed from outside the producing country by a system of representative offices with payment advances to exporters who in turn pass advances to regional intermediaries and a complex array of local assemblers and agents that deal with farmers. There are processors from India and Vietnam that buy directly in the countries of origin either on FOB basis or delivered to warehouses leased for the harvest season but these are few.

The RCN business has a "trader" business culture. It is speculative, volatile and characterised by low levels of trust. Contract default is commonplace and rarely resolved through formal legal or arbitration channels.

It is not unusual for the value of RCN in the international trade to exceed the equivalent cashew kernels price. This arises due to speculation and the fact that, as a market protected by import barriers, the Indian cashew kernels market almost always trades at higher prices than the international market. The only country that differs from this system is Tanzania which has a seasonal export auction system managed by the Cashew Board of Tanzania and the Tanzanian Mercantile Exchange in cooperation with the farmers' cooperative unions.

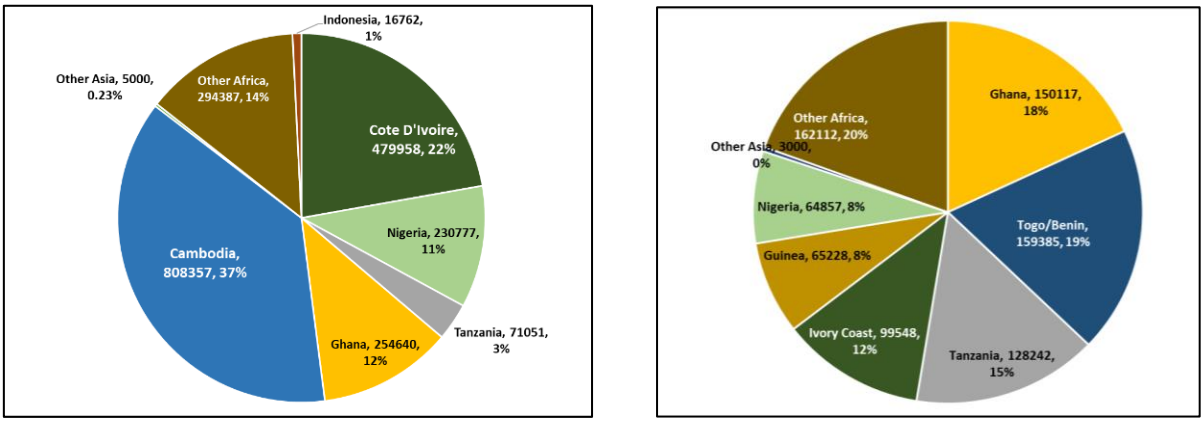
FIGURE 3-9 INTERNATIONAL CASHEW TRADE CHANNELS COMPILED FOR THIS STUDY FROM TRADE DATA.



[15] Vietnam Customs Service statistics.

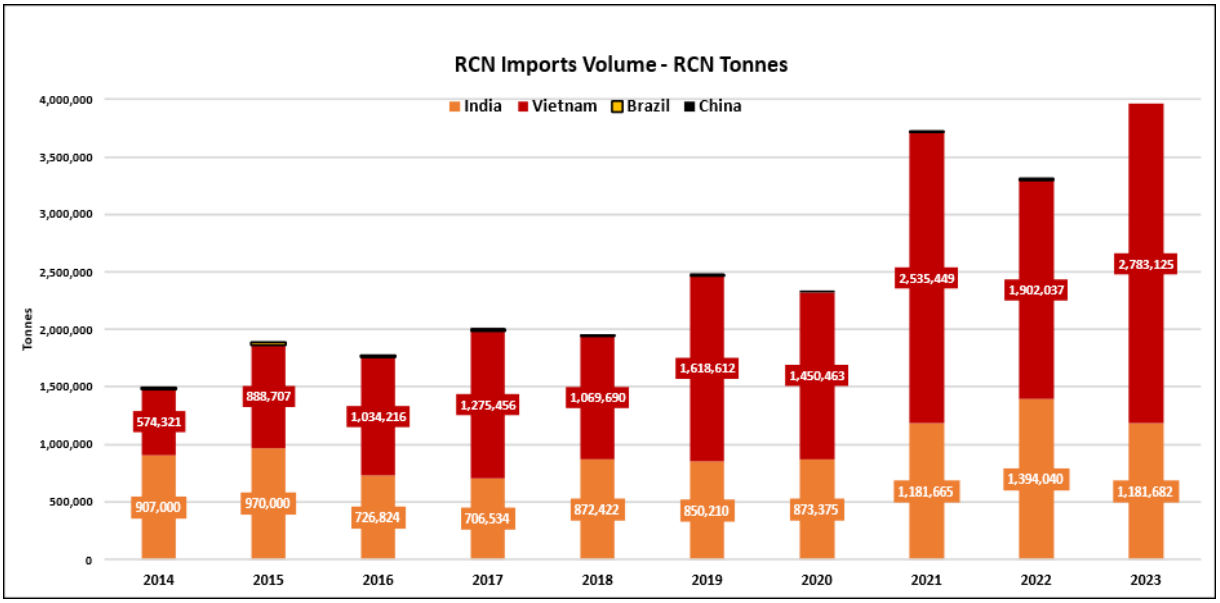
Imports of RCN to India are mainly for processing and consumption in India. Only 11% of the cashew nuts processed in India in 2023 were exported as cashew kernels. Vietnam is different. More than ninety-five per cent of the domestic production and imported RCN is processed for reexport to markets worldwide. As mentioned above, Vietnam has large market shares in all markets and a dominant position in most. This dominant position has not led to higher profit margins and/or higher prices for processors. Over the past twenty years Vietnamese processors have reduced costs, sales prices and product quality through use of technology and economies of scale to achieve price points allowing market dominance. This has reduced Indian and Brazilian market share and made the establishment of the African cashew processing industry more difficult. Surprisingly in this context Vietnamese processors regularly, and genuinely in our judgement, complain that their businesses are not as profitable as they should be. Dependence on raw material imported from long distance has been the primary reason for this.

FIGURE 3-11 SOURCES OF SUPPLY OF RCN 2024



Vietnam Jan-Sept 2024 India Jan-Aug 2024

FIGURE 3-10 IMPORTS OF RCN BY COUNTRY OF DESTINATION SOURCES: INDIAN MINISTRY OF FINANCE, VIETNAM CUSTOMS SERVICE



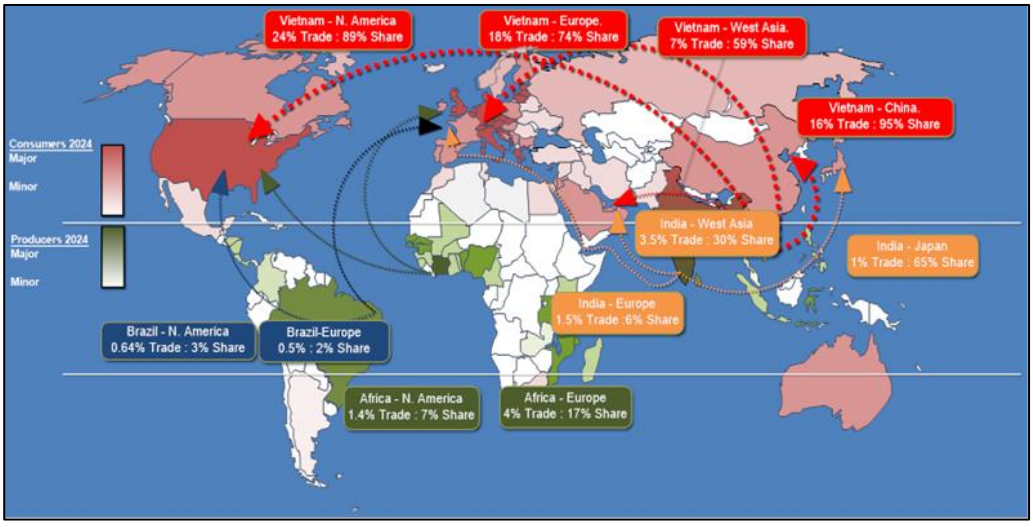
The long-distance supply chain has also contributed to a rising environmental cost of the international cashew value chain. The environmental sustainability of the international RCN chain in which, in 2023, almost 4 million tonnes of RCN were transported up to 10,000 km to be processed and then, in the case of Vietnam, transported back to distant markets is widely questioned inside and outside the sector. It has been estimated that a cashew nut grown in West Africa, processed in Vietnam and consumed in Europe may have travelled up to 30,000 km on its journey to market.[16] This compares to a cashew nuts processed in West Africa with a journey of 7,000 km to market.

It has also been impacted by regulatory changes at origin. African governments have introduced policy and regulatory measures to improve the opportunity for value added activity in the countries of origin and to build revenue streams from the international cashew trade in RCN ostensibly to support producers and sector development. These measures include export tariffs, export "windows" regulating the periods in which export can take place, export prohibition (in Benin and Kenya), licensing systems and pricing mechanisms including minimum prices and reference prices. These have increased the cost for buyers of RCN and may have reduced farm gate prices in some circumstances.

Figure 3-12 illustrates the major channels in the international cashew kernels trade. The primary channels are from Vietnam to Europe, North America and China. These account for 18%, 24% and 16% of World export trade, respectively. Vietnamese processors have dominant market shares in each market. India due to its higher quality cashew kernels maintains a 30% share of the market in the Middle East, a 65% share of the demanding Japanese market and a 6% share of the EU market. The market share of India is generally maintained in less price sensitive but high-quality market segments especially on the aspects of kernel colour and taste.

Africa's share of the cashew kernels market has been increasing. In 2023, African processors established a 17% share of the European market. This increased to 21% in the first half of 2024. Africa's total share of the international kernels market trebled to 12% in the ten years up to 2023. This indicates buyers' willingness to consider new sources of supply and their concern with a sustainable supply chain.

FIGURE 3-12 CASHEW KERNELS TRADE CHANNELS



[16] Fitzpatrick, Benchmarking the Cambodian Cashew Sector, GIZ, June 2023.

From a regulatory and buyers requirement perspective there are other questions. These relate in particular to traceability which is becoming both a legislative and commercial requirement for risk management, harmful emissions and business practices along the RCN chain which lacks transparency. Regulations and codes of practice are in place or in the pipeline especially in the important EU market as outlined in the EU Commission Directive 2024/1760, Directive on Corporate sustainability due diligence (CSDDD)[17] Calculations for this study estimate that in 2023 only 35% of the world cashews were processed in their country of origin meaning that 65% may constitute a risk.

Key points:

- The international trade in RCN is fast growing.
- It is a volatile and speculative trade in which the relationship between raw material cost and kernels prices may be out of alignment for long periods.
- The RCN trade increases the environmental impact of the cashew sector and reduces its ability to meet buyers' requirements in key markets.

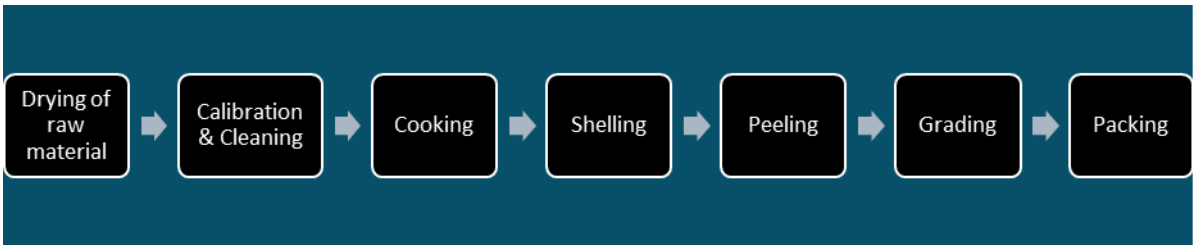
3.4 Cashew Processing

Cashew processing is the separation and removal of the shell and the grading of the resulting kernels into commercially workable grades according to international specifications. The key international specification is the AFIUS[18] specification although variations exist for markets in india, China and Brazil. Due to the hard shell and the cashew nutshell liquid in the honeycomb inner shell cashew processing is a complex process. Mistakes in the process can damage the nut kernels and reduce its value through breakage, loss of taste or damage by the cashew nutshell liquid.

This complex process goals are: -

- To extract the potential weight of kernels from the raw cashew nut.
- Maximise the whole kernels outturn.
- Ensure that the light ivory/pale ash colour is preserved.
- Keeping the natural taste of the kernels.
- Ensure that food safety risk is mitigated at all stages.
- Extract the value of by-products such as shell and Cashew Nutshell Liquid (CNSL).

FIGURE 3-13 BASIC CASHEW PROCESSING DIAGRAM



[17] https://commission.europa.eu/business-economy-euro/doing-business-eu/sustainability-due-diligence-responsible-business/corporate-sustainability-due-diligence_en
[18] Association of Food Industries https://afius.org/wp-content/uploads/2024/05/cashews.pdf

Success in the achievement of these goals is influenced by some key factors ranked in order of importance although they are interlinked: -

i. The quality of raw material
ii. The post harvesting handling, drying and storage of raw material.
iii. Skills of managers and staff in implementing the process.
iv. The machines and technology chosen and installed.
v. Factory layout and quality management systems.

Cashew processing was, up to 20 years ago, a largely manual work process employing hundreds of thousands of workers. In Vietnam, Brazil and Africa today it employs purpose designed and built technology. India is in transition from medium scale manual and semi manual processing to mechanised processing. In Cambodia, the larger plants use machines for processing usually from Vietnam or China. Even the smaller units often have some form of mechanisation of the process.

Discussion Box 1
To understand processing, it is important to understand the basics of grading and value: -
1. Wholes (the second W in "WW") are more valuable than broken.
2. Large kernels are more valuable than small kernels.
3. Pale ivory kernels (the first W in "WW" are more valuable than scorched "SW" or spotted "DW".
4. Large size broken nuts are more valuable than small broken.

Example November 2024

WW180 White Wholes, 170-180 kernels	*FOB Price US$ 4.30 per lb.*
WW320 White Wholes, 300-320 kernels	*FOB Price US$ 3.35 per lb.*
SW320 Scorched Wholes (off colour)	*FOB Price US$ 2.90 per lb.*
Fancy Splits Half kernels broken lengthways	*FOB price US$ 2.45 per lb.*
Large White Pieces Sized pieces of natural colour	*FOB price US$ 2.00 per lb.*

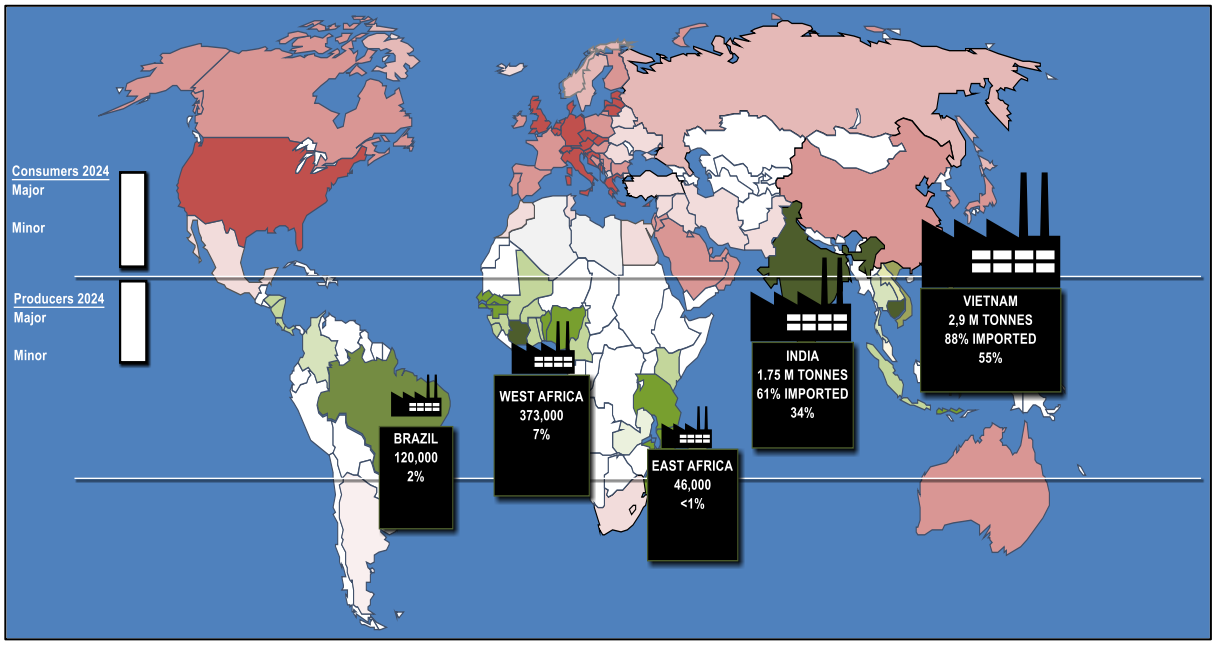
There are 36 commercially traded grades. Each category is categorised by colour e.g. WW, SW, SSW Second Scorched Wholes and DW Dessert Wholes and by size.

The technology means that the scale of factories and the initial investment have increased. It also has increased the proportion of nuts that are broken in the process but has reduced the food safety risk. There are fewer workers sometimes by a factor of ten but the challenges for managers are technically greater as the task switches from managing people to managing machines. The larger scale also means that a factory needs more working capital to function. In Vietnam and India this is partially overcome by the import of raw material utilising the annual crop cycle and financing of the trade in RCN by international trading businesses.

Cashew processing is highly centralised. India and Vietnam combined, accounted for 89% of processing in 2023. African cashew processing capacity has grown at a CAGR of 16% over the past ten years but low utilisation of installed capacity (calculations for this study estimate just 54% utilisation rate) in new plants and difficulties with access to working capital have slowed the growth of volumes processed. Government supports for investors are present and have been expanded. India's strong processing industry is based on the high domestic consumption and the effective closure of the Indian market to imports of kernels. Vietnams success has been based on the development of technology for processing, innovation in

processing organisation, excellent process management and access to financial services. This was initially supported by the Government but during the huge growth of 2000 – 2010 technical support was less than in other producing countries. Vietnamese processors still benefit from preferential interest rates for raw material procurement.

FIGURE 3-14 WORLD CASHEW PROCESSING DISTRIBUTION 2023.

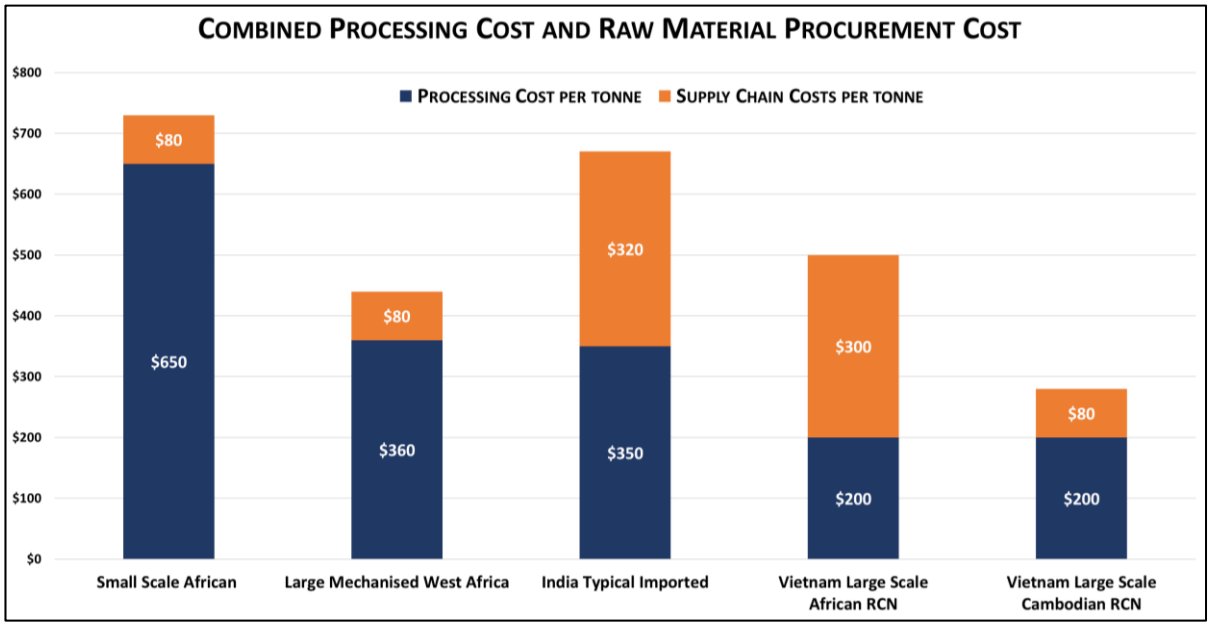


Factor/Region	India	Vietnam	Africa	Brazil	Cambodia
Business type	SME/Family. Some corporate	SME. Entrepreneur & FDI.	Mixed - FDI Entrepreneur Social impact	Corporate	Family Corporate
Scale Tonnes RCN	Mid/Small 1000-15,000	Large 15,000 plus	Mid & Large 5,000-30,000	Large 10,000-30,000	Micro & Medium Large
Import dependence	50-60%	80-85%	0%	10%	0%
% of the crop processed	235%	285%	12%	100%	~3%
Key markets	Domestic India	US/EU/China	US/EU	US/EU	Domestic EU, China
Technology	Semi Mechanised/ Manual	Mechanised	Mechanised & Semi Mechanised	Mechanised	Semi mechanised
Product quality	Very high/high	Low/moderate	Mid/High/Very high	Mid.	High

FIGURE 3-15 COMPARATIVE SUMMARY OF PROCESSING

However, this cost advantage has been reduced two key reasons. Firstly, the technology has become available to processors in other countries enabling them to transition from old-style small-scale labour-intensive processing to modern semi-mechanised processes. Secondly, the cost of the transportation of RCN from the production area to factories in Vietnam has

FIGURE 3-16 COMPARATIVE PROCESSING COSTS



increased due to factors such as higher freight rates, export taxes on RCN, minimum pricing regulations at origin and longer transit times. Based on interviews conducted with processors, Figure 3.16 illustrates the basic costs of processing and transportation of RCN for five examples. It indicates that whereas Vietnam has a significantly lower cost of processing per tonne of raw material, it has a higher cost of assembling raw material than competitors in African countries due to its import dependence. Africa processors therefore have a buffer cost so that they do not have to match Vietnams low cost of processing to be competitive.

However, when this supply chain cost of raw material is reduced in the case of RCN sourced in Cambodia, Vietnam processors are highly competitive. This means that in order to be competitive, prospective processors in Cambodia must be closer to the processing costs of Vietnam than competitors in Africa. Competitive can mean in terms of processing cost and/or sales prices. Sales prices can be improved by value addition, quality, certification, innovation and branding. However, in the current situation in Cambodia, it may be more important for processors to be competitive at the farm gate in order to secure supply and the loyalty of farmers. This competitiveness challenge is key. It is a function of 1. location close to Vietnam and 2. the lack of export taxation of RCN between Vietnam and Cambodia. Only two major RCN exporting countries do not levy an export tax, Nigeria and Cambodia[19]. Elsewhere taxes range from US$ 30 per tonne to US$ 180 per tonne calculated either as an ad valorem tax or at a fixed rate. Export taxes have proved difficult to enforce on land borders in African countries. There is a risk that trade is forced through informal channels as happens currently on the Cote d'Ivoire-Ghana, Benin-Togo and Guinea Bissau- Senegal borders.

Key points:

- Cashew processing is highly centralised.
- Modern, mechanised, large-scale plants have a significant cost advantage.

[19] As a new processor Cambodia is not included in this analysis of leading processing countries. There is a detailed discussion of Cambodian cashew processing costs in sections 5.2.3 and 5.2.4 below.

- Supply chain costs have increased, eroding the cost advantage of Vietnamese processors for African RCN.
- Existing and prospective processors in Cambodia must compete with Vietnamese processors at the farm gate for raw material as well as for international market share in the kernels market.

3.5 Price Trends

International prices for cashews kernels and RCN tend to go through periods of volatility with a wide range between the highs and lows. In the decade 2014-2023 the benchmark grade WW320 ranged from US$ 5.25 – 2.40 per lb[20] FOB, a range of 118% or almost US$ 100,000 on the value of a typical 20 ft container of cashew kernels. Price volatility was reflected in all segments including at the farm gate except at the retail level in Western markets where supermarkets did not reduce prices during the low-price period.

It is not unusual for a relatively minor supply/demand deficit to turn into a speculative bubble. This has happened four times in the past 25 years - in 2004-05, 2007-08, 2010-2011 and 2016-2017. Only once, in 2004-05, was this caused by an upswing in demand. On the other occasions it was a response to a perceived crop shortage in more than one origin. A minor shortage in production has often led to a level of price volatility that is unjustified by the fundamentals of supply and demand. The lack of transparency and good market information systems has tended to fuel to speculation causing prices to rise too quickly and too high as shown in Figure 3.17 during 2016-2017. These “price bubbles” have usually been followed by a sharp correction in prices.

Since 1985 there has been only two periods that saw a major price fall based on over supply[21]. They were during the early years of this century 2003-2005 in response to the rising production in West Africa and more recently during the period April 2022- December 2023 when the cashew kernels market fell from long term average prices to 14-year lows. This reaction was in response to the surplus caused by the increase in Cambodian production as described above and the sudden fall in demand in mid-2022 as a result of the impact of the Russian attack on Ukraine in February of that year. The market remained at historically undervalued levels until it responded in mid-2024 to the lower crop in West Africa and the surge in demand which was a response to the low prices of the previous two years.

High levels of price volatility have hindered the development of the sector. During periods of price volatility demand growth tends to stall, investment in processing is slowed and farmers may react to short term trends causing them to miss longer term opportunities. The negative reputation of the sector for high risk and unpredictability among financial institutions has grown. There are examples. In Cambodia, trees planted in 2018-2020 were removed in 2022 according to cooperatives interviewed during the fieldwork for this study and according to press reports based on CAC events[22]. In West Africa, local financial institutions have been unwilling to fund working capital for processing projects preferring to finance the short-term risk of RCN assembly and export[23]. In Vietnam price volatility has caused leading processors

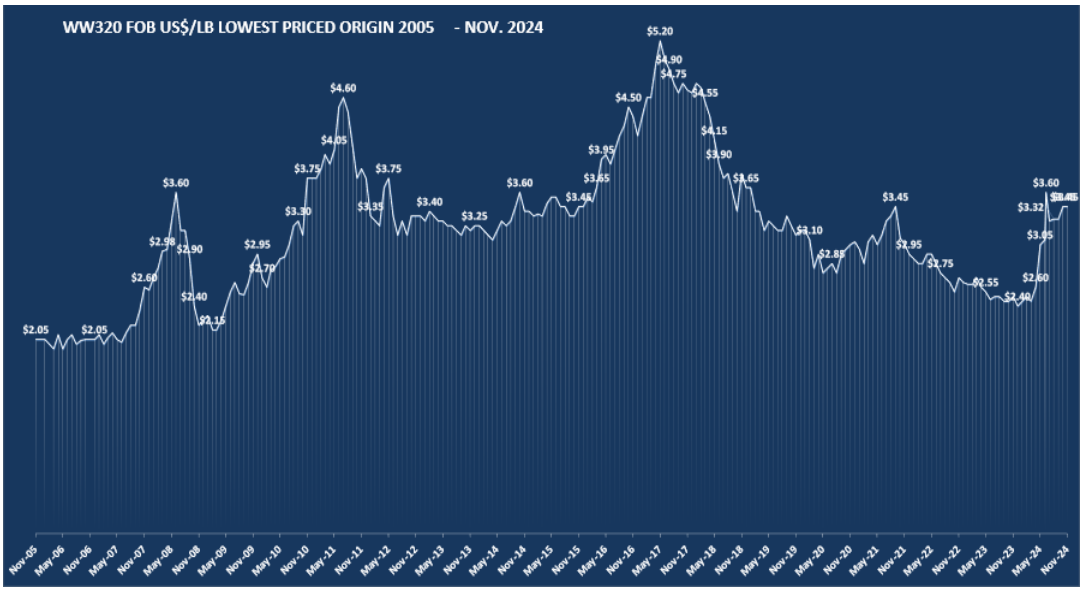
[20] International pricing for cashews is usually denominated in US$ per imperial lb. .
[21] www.thecashewclub.com – a membership database and market information service.
[22] https://www.phnompenhpost.com/business/over-100000ha-cashew-trees-ditched-due-deflated-prices
[23] Fitzpatrick. J, Cashew Policy Series 2022, Value Addition Policy and Support Development, West Africa PRO-Cashew Project USDA, October 2022.

to struggle for profitability during period of price volatility such as in 2023-2024[24]. Price volatility also increases the risk of contract default as mentioned above which tends to perpetuate the volatile phase.

Price volatility has had a strong influence on policy and regulation. In West Africa the introduction of the Tanzanian RCN Auction in 2007 and the widespread introduction of minimum pricing at the farm gate were responses to low market prices[25]. The introduction of export prohibition during the early part of the season in Mozambique and Cote d'Ivoire were responses to high prices. Unfortunately, the regulatory response has often been left in place after the conditions that necessitated it have changed.

Figure 3.17 charts international prices for the benchmark grade WW320. The prices are based on the most competitive prices in the international market for 3 months forward shipment offered by a medium class shipper i.e. they are the typical prices quoted in the market in everyday discussions. In practice in recent years, they are prices FOB Vietnam. These are the prices that Cambodian processors might be confronted with when marketing cashew kernels. The overall price trend over the period has been upward. In general, the high prices during each rally and the low during each dip are higher than in the previous period. The exception was during 2023 when the low prices returned to levels of 14 years earlier.

FIGURE 3.17 CASHEWS WW320 FOB PRICES PER LB SOURCE INGREDIENT SOURCING SOLUTIONS DATABASE



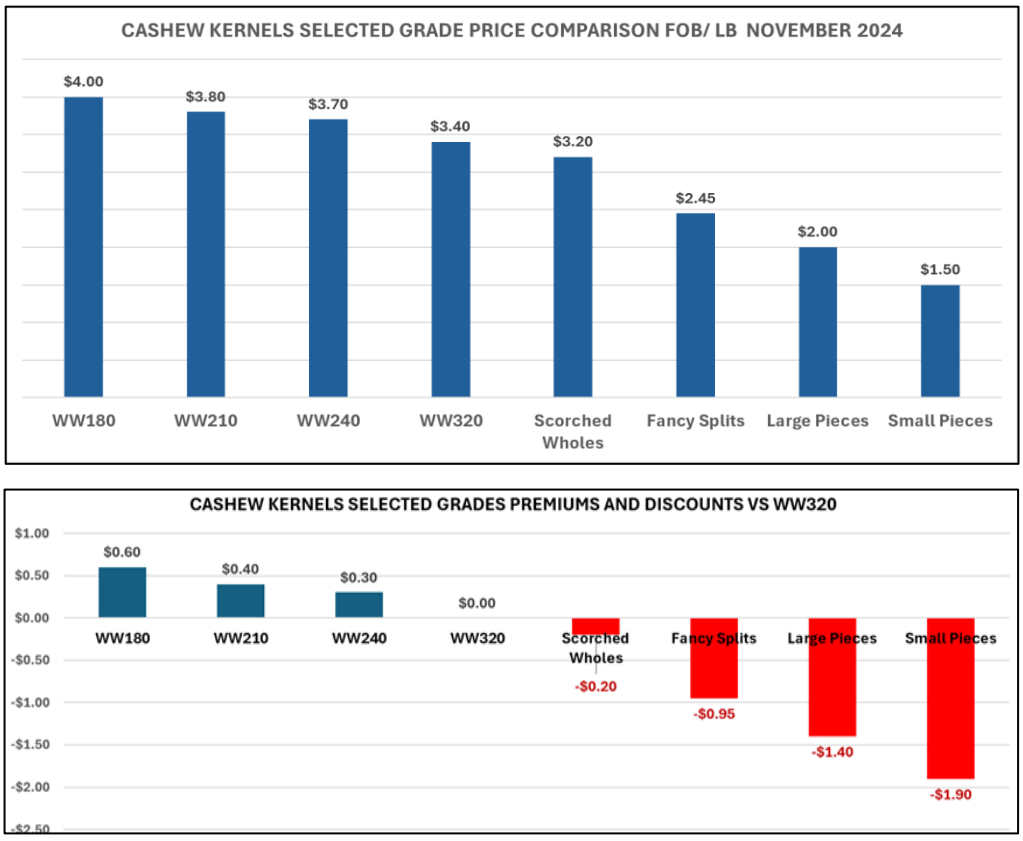
Different grades command different prices in the market. This was broadly outlined above in the section on processing. Figure 3.18 gives broad view of the premiums and discounts in the market as of November 2024. It illustrates the impact on sales revenue of breakage in the process and the potential for premium pricing for larger cashew kernels.

Within the broad trend of prices individual contracts are influenced by a range of factors such as grade, quality especially colour of the kernels, the reliability of the processor, freight cost,

[24] Interview with Prosi Thang Long (large Vietnamese processor) for this study and presentations by Vu Thai Son at the World Cashew Conference 2024 www.cashewconference.com
[25] Fitzpatrick. J, The effectiveness of Policy and Regulation in the Cashew Sector 2008-2022, West Africa PRO-Cashew Project USDA, July 2022.

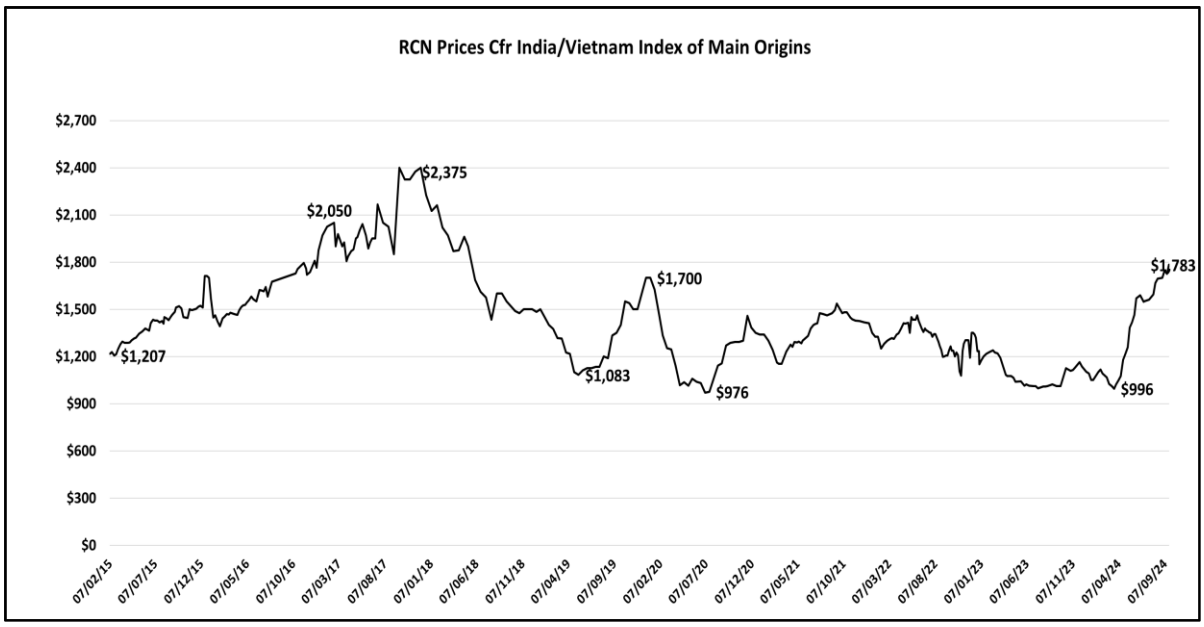
delivery time to destination, packaging, food safety certification and increasingly by factors such as traceability, business practice certification and sustainability. For example, since 2022 West African cashew kernels that meet the quality and food safety requirements have been able to attract premiums in the range of US$ 15-25 cents per lb in the European and North American markets based on their location, quality and proximity to market. Indian cashew kernels are priced in a range of 40-60 US$ cents per lb. for markets in the UAE where their taste and colour are highly valued.

FIGURE 3-18 KERNELS GRADE PRICE COMPARISON



RCN prices tend to move in line with cashew kernels although it can vary as to which of the two leads the trend. This was discussed above relative to processing. Figure 3.19 illustrates the trend in RCN price based on an index of international trade calculated from the available offered prices for available origins. It does not take into account differences in quality offered, as RCN is not traded according to a standardized specification.

FIGURE 3-19 RCN PRICES PER TONNE CFR INTERNATIONAL MARKET



Key points:

- Cashew prices are volatile with a long-term upward trend.
- Prices move in response to fundamentals, but speculative price bubbles are a feature.
- RCN and cashew kernels prices be misaligned from time to time.
- Price volatility has been a barrier to sector development.

4. Cambodia in the World Cashew Market

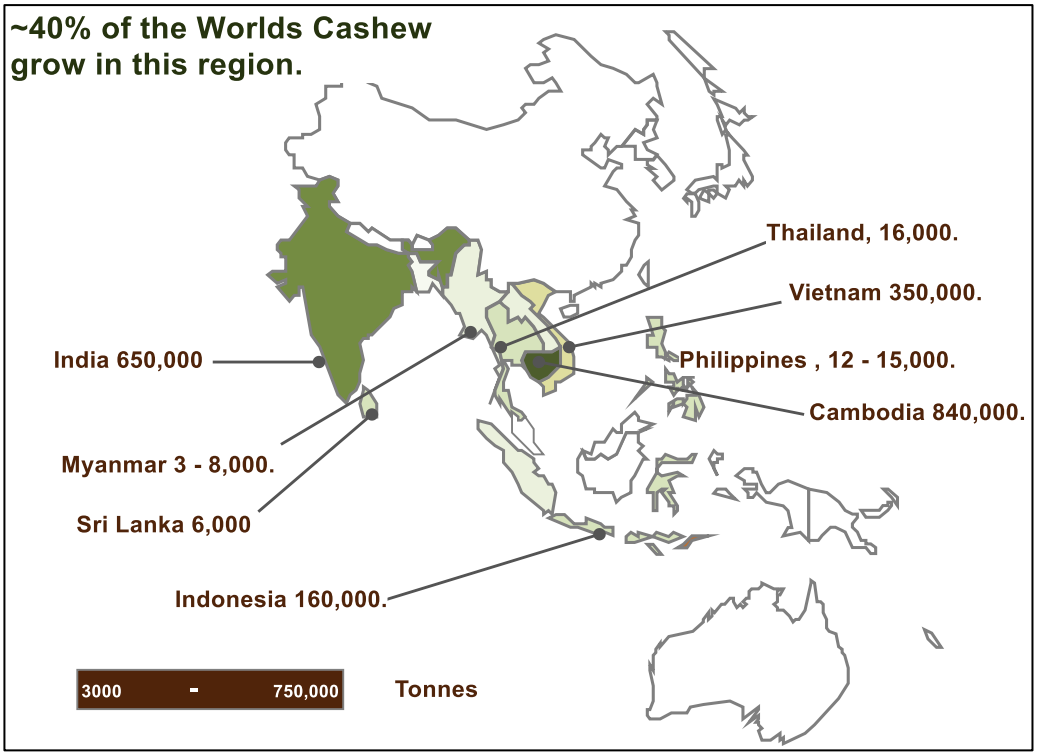
4.1 Locating Cambodia in the Regional and World Market

As outlined above, Cambodia has been the second or third largest producer of cashews since the increase in production in 2021. Cambodia is located in a region that is an important producer and consumer of cashew nuts with approximately 40% share of World production and 53% of consumption. It is also the region in which more than 90% of the World's cashews are processed. This creates both opportunity and competition for the Cambodian cashew sector.

Competition from other producers in the region is limited. The only country in the region that is self-sufficient in cashews is Indonesia. Vietnam, India, Thailand and The Philippines all import cashew nuts either as RCN in the cases of Vietnam and India or as kernels. Competition from Indonesia is limited as exports are low in the range of 40-60,000 tonnes of RCN depending on the harvest. Indonesia also imports cashew kernels. Nor is production growth in the region likely to threaten Cambodia's leadership based on current trends. Indian and Vietnamese production is static/very slowly increase. Indonesian production is growing at CAGR of 2.25% over the past 10 years. Thailand, The Philippines, Myanmar and Sri Lanka have relatively low production and have been relatively slow growing for many years. Therefore, as a producer and exporter of RCN, Cambodia's competition is in African countries where production is likely to continue to grow at current rates.

As discussed above, the costs of transportation from West Africa to regional markets is rising and is more than five times the cost of delivery from Cambodia to Vietnam. In addition, the time taken for delivery (days as opposed to months), the timing of availability (January-June as opposed April-December) and lower risk for processors in Vietnam and potentially in India mean that Cambodia is likely to remain a competitive supplier of RCN. Ideally Cambodia would have more than one market for RCN but the costs of export and shipment to India seem likely to continue to discourage Indian processors particularly as their early season needs are met from the large domestic crop.

FIGURE 4.1 REGIONAL PRODUCERS 2024



There are opportunities to develop supply chains, including processing to meet the needs of regional importers and consumers[26]. However, the largest market within the region, India, is inaccessible to cashew kernels imports. The Indian market is protected by high levels of import restriction and customs duties, effectively banning the import of cashew kernels. This system was introduced to protect jobs in India's labour-intensive processing sector. This leaves opportunities in regional, high-quality, demanding markets such as Japan, Korea, Thailand or Taiwan in competition with high quality Indian cashew kernels. In markets such as The Philippines, Australia and New Zealand, Vietnamese suppliers dominate, and price sensitivity is greater which means that competitiveness will be more difficult to achieve for the start-up processing sector of Cambodia. Cambodian processors must make good market selection decisions.

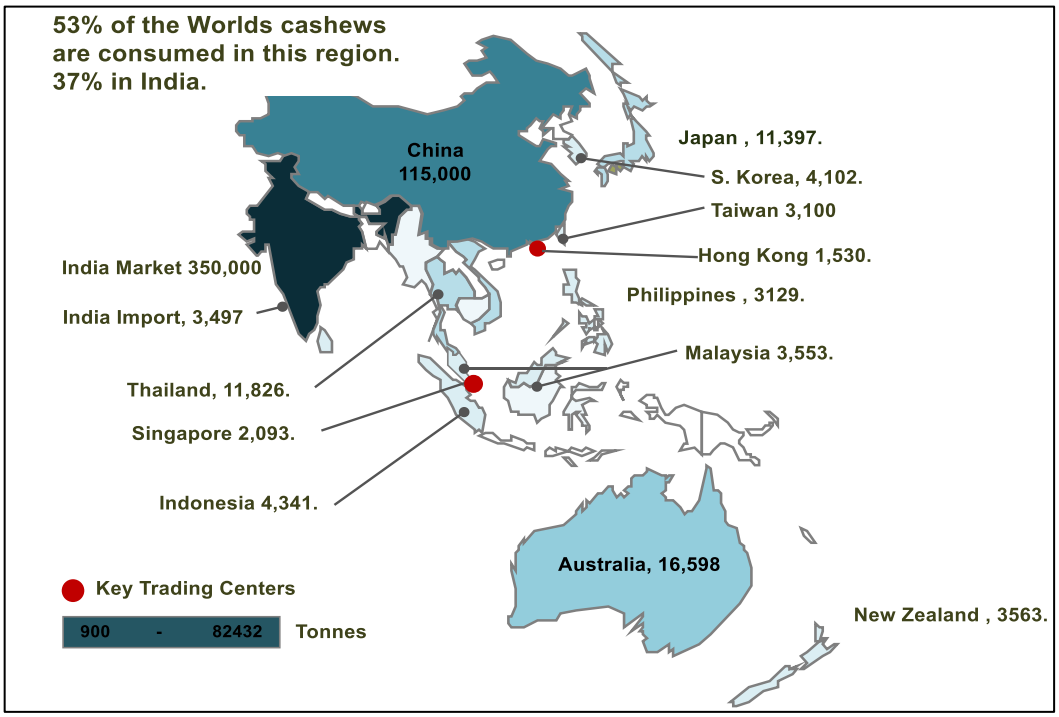
The largest, fastest growing and highest potential market in the region is China. It does not produce cashews and does not have conditions for the production of cashew nuts. It is a large producer of walnuts and an increasing producer of hazelnuts, but these generally supply segments away from mainstream cashew applications e.g. as confectionery. Chinas imports

[26] Fitzpatrick, Opportunities for African Cashew Processors in East Asian Markets, Technoserve 2018.

of cashew kernels grew by a CAGR of 18% in the five years up to 2023. There was very fast growth in 2023 of 52% [27]and, so far, in 2024 (Jan-Oct.) Vietnam's exports to China are up by 20%[28]. This may signal that China has "discovered" cashew nuts in the same way that it discovered almonds and pecan nuts in the past when a surge in demand was followed by a period of steady growth.

The Chinese market is diversified with some segments highly price competitive and others more quality orientated. Vietnam is the dominant supplier with approximately 95% market share. There is evidence of a willingness to consider other suppliers. There have been imports from African countries in recent years[29]. Cambodia has already opened this market with small scale exports. China is an important market for Vietnamese exporters and strong competition can be expected. A growing trend in China is the import of partially processed, unpeeled kernels. This appears to be intended to avoid VAT and import duties.

FIGURE 4-2 REGIONAL IMPORT AND CONSUMPTION CASHEW KERNELS



At a regional level, the total volume imported annually to all markets is approximately 180,000 tonnes of kernels or in RCN tonnes approximately 820,000 tonnes at the average outturn conversion rate of 22%. That is approximately the same figure as Cambodia's RCN export to Vietnam in 2024 January to November. Clearly high value markets in the region offer opportunity for Cambodian processors but it is equally clear that in the long-term Cambodia would need to seek markets outside the region such as in Europe, the Arabian Gulf and North America.

[27] UN Comm Trade
[28] Vietnam Customs Service.
[29] Chen Ying, Trends Shaping China Cashew Kernels Market and Outlook, Presentation at the World Cashew Conference, Macau 2018.

There is an area of potential opportunity that is a recent development. That is the trade in "borma" kernels. Borma is an Indian word for an oven. It is used to describe the heating chambers in cashew factories that are used to expand the skin or testa after cooking and before peeling. Borma kernels are cashew nuts that have been shelled and heated in the borma oven but not peeled. In recent years, a trade has developed from Africa to Vietnam and China where the nuts are peeled mechanically. It was originally intended as a way of easing capacity issues in African factories especially shortfalls in working capital and low marketing capacity. For African processors it has now largely become a way of circumventing export taxes whilst attracting investment incentives. In 2024 up to October, VINACAS reports an imported volume of 90,000 tonnes[30].

Interviews during the fieldwork for this analysis confirmed that some processors in Cambodia are engaged in this trade already. They supply Vietnamese processors relatively low volumes so far. This activity is not a substitute for full processing value addition. It leaves the problem of by-products and long-term development behind. It may provide some short-term opportunity especially for direct supply to China. A significant lesson from the African countries is that it also inhibits growth of processing over the longer term.

Key points:

- Cambodia is the largest regional producer.
- The regional market is segmented with differences in buyers' requirements on quality and price competitiveness.
- China is a key market but is dominated by Vietnam.
- Current import levels in the region suggest that a Cambodian processing sector must seek outlets outside the region in direct competition with Vietnamese, African and Indian processors.

4.2 Benchmarking Cambodia in the World Market

The key factors identified to benchmark a cashew sector's competitiveness in the international market are[31] categorised into the areas outlined in Figure 4.3.

FIGURE 4-3 BENCHMARKING PARAMETERS

Production Performance		Marketing		Sector Organization	
Quantitative	Qualitative	Quantitative	Qualitative	Quantitative	Qualitative
Quantity produced - tonnes	Outturn – lbs/ 80 kgs.	Export price VS International price	Farm gate prices and price volatility season averages	Sector organizations	Organizational linkages
Yield – KGS per hectare	Size – nuts per kg	RCN VS Processed kernel's marketed	Post harvest handling	Government policy	Process type and ownership

[30] Discussion with processors and traders for this study.
[31] Fitzpatrick. J, Competitiveness of the African Cashew Sector, GIZ 2010 & Gates Foundation 2018.

Tree Age	Varieties Climate and soil	Number of processing factories	Markets and market diversification.	Regulation	Stakeholder engagement and consultation
Farm size – hectares	Farmer assess to training and inputs	Export Markets	Processing technology and organization	Supports for processing and production	Communication
Cost of production	Biodiversity	Value added at farm and processing levels	Numbers employed	Research – varietal and production methodology	Awareness
Pests, diseases and use of inputs.	Sustainability and resilience to climate change	Logistics cost efficiency and export processes	Market Access	Access to credit	Market information availability
		Quality control.	Use of by products		

In this section we will look at some of the quantitative factors to place Cambodia in the international market as outlined in Figure 4.4. The rest of the quantitative factors and the qualitative factors comprise part of the value chain analysis to follow. The information and data used in this section are drawn from the existing literature, statistical information on agriculture and trade data as well as the information proved by interviewees during the fieldwork for the analysis and the EU CAPSAFE Consultation Workshop in Phnom Penh on 11th December 2024.

FIGURE 4-4 BENCHMARKING CAMBODIA ON BASIC FACTORS – 2024 SOURCES LITERATURE AND INTERVIEWS

Factor/Region	Cambodia	Vietnam	Cote d'Ivoire	India	Cambodia Ranking vs all producers
1 Production tonnes	840,000	345,000	1,200,000	750,000	2nd
2 Climate	Good with risk of extremes – rain or heat due to climate change	Good – Risk of rains during flowering	Ideal growing but rains during harvest	Ideal	1st or 2nd
3 CAGR 10 Year	33%	0.9%	7%	0.9%	1st
4 Yield per ha kgs.	1440 (MAFF)	1100 average	400	706	1st
5 Farm Size	78% 2-5 ha	2.5 ha	4 ha	<2 ha	2nd
6 Tree Age	68% < 12 years	75%>20 years	80%<20 years	60%<20 years	1st
7 Varieties	High yielding hybrids and traditional	High yielding varieties	Local unselected varieties	Mix	Top 3
8 Outturn	28-30%	29%	25%	28%	2nd

9 Nut size	95-110	190-110	195-215	170-190	1st
10 Post harvest	No drying on farm/ PPP bags	Drying on farm. Jute bags	Drying on farm/ PP bags	Drying on farm/Jute bags	Low
11 % of the harvest processed	<2%	285%	21%	235%(Import)	22nd
12 Markets	Vietnam RCN	Multiple kernels	RCN 79% Kernels 20%	90% domestic	Low
13 Policy development	Developed but not yet implemented	Implemented	Developed, Implemented	Developed and implemented	5th

Based on the thirteen factors listed in Figure 4.4 Cambodia is ranked highly as a producer of cashew nuts both in quantitative and qualitative factors. Cambodia ranks first or second in eight of the thirteen factors. This benchmarks Cambodia firmly as a significant producer of high-quality cashew nuts that are in demand for processing. On the other hand, Cambodia ranks much lower once the product is harvested. Post-harvest handling and processing value addition are among the lowest of the major cashew producing countries in the World. These factors will be discussed in more detail in the value chain analysis in the next chapter.

Key points:

- Cambodia is benchmarked as a key producer of cashew nuts.
- Product quality is ranked highly.
- Post harvest and value addition is at an early stage and currently low ranked. Some low-ranking factors are related to infrastructure and investment. Others are related to poor practice in the value chain.
- The situation is similar to other cashew producers in an early stage of development including Vietnam in the 1990s. The significant difference is the scale of production.

4.3 The Impact of Cambodian Production Growth on the World Market

The increase in Cambodian cashew production since 2020 has fundamentally altered the supply/demand balance worldwide as outlined in Chapter 3 The World Cashew Market – Situation and Trends. There are five key aspects as follows:

1. Cashew prices fell to 14-year lows for almost two years. This impacted farm gate prices in Cambodia and across the producing countries. Anecdotal evidence from fieldwork suggests that it was the cause of tens of thousands of hectares of new cashew trees being replaced with other crops. The estimates vary from 40,000 (CCF) to 100,000 (CAC) hectares.

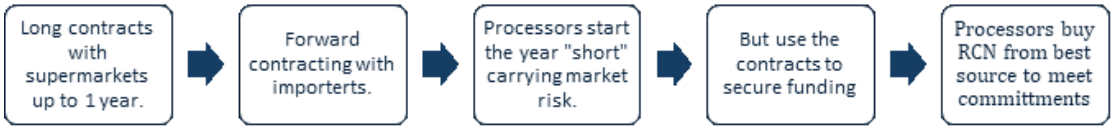
2. In the period from 2019-2024 Cambodia was the driver of World production growth increasing its production share from 4% in 2018 to 17% in 2024.

3. The Cambodian harvest increase has impacted the availability and sourcing of raw material by Vietnamese processors. Due to the crop timing and location, the nuts harvested in Cambodia are harvested earlier and therefore available earlier to processors in Vietnam than the other sources of supply. This has fundamentally

changed the approach of Vietnamese processors and the traders that supply them to sourcing RCN in Africa.

There is much less pressure on processors to buy in African countries as they may already have acquired up to 400,000 tonnes in Cambodia in January-February and the same volume again in March-April. This diversifies the supply chain risk that processors in Vietnam who, due to the fact that they must make forward sales to buyers in Europe and North America, start every season with a short position i.e. contracted kernels for sale but not yet bought the raw material for processing. It also opens the opportunity for them to trade between Cambodia and Africa to keep prices under control. Figure 4.5 illustrates this process.

FIGURE 4-5 FORWARD CONTRACTING FOR PROCESSORS

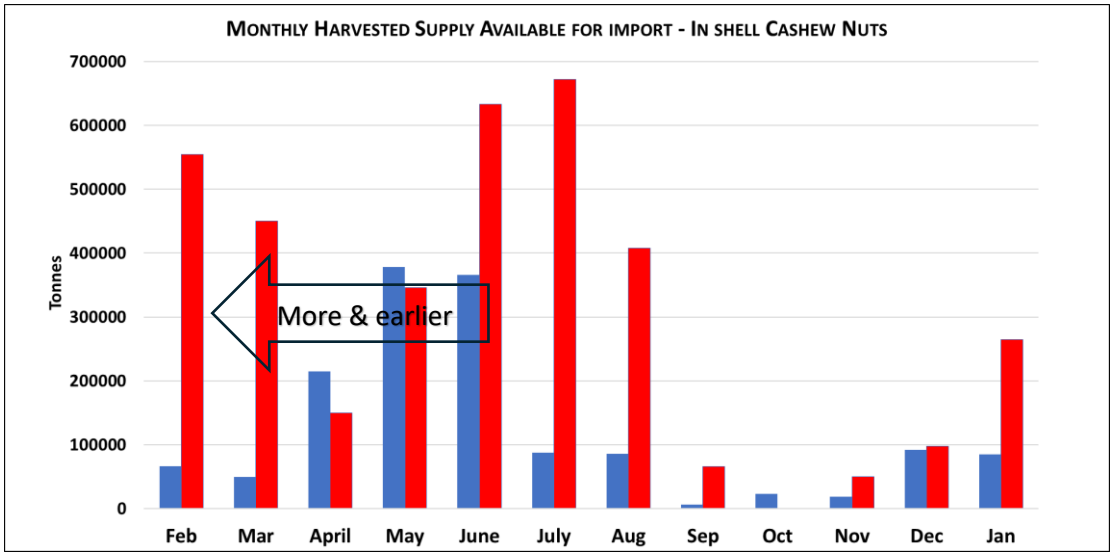


Forward contracting by processors creates market risk for the processors and counterparty risk for the importer or roaster that relies on them to meet their commitments. It can add to market volatility especially as the cashew sector is poorly served by market information. In situations where the crop is less than expected the market can move quickly as processors look to manage their market risk by buying RCN. Prices rise and counterparty risk increases for end buyers who may enter the market to manage the risk creating a second and even third wave of buying. This happened in 2017 causing volatility, encouraging speculation and creating a situation in which the market prices rose far beyond the price levels justified by the fundamentals[32].

Understanding this market scenario is important in understanding that the impact of Cambodian cashew production is more than just the additional production volume. Figure 4.6 indicates the scale of this change in available RCN. The blue bars indicate raw material availability each month in 2015. The red bars indicate the position in 2024. The volume available has increased but also significant is that the volume availability is earlier now due to the Cambodian production increase.

[32] For further explanation see videos (73) of the webinar “ACA Global Market Encounter with Jim Fitzpatrick” on the African Cashew Alliance YouTube channel Africancashewa - YouTube

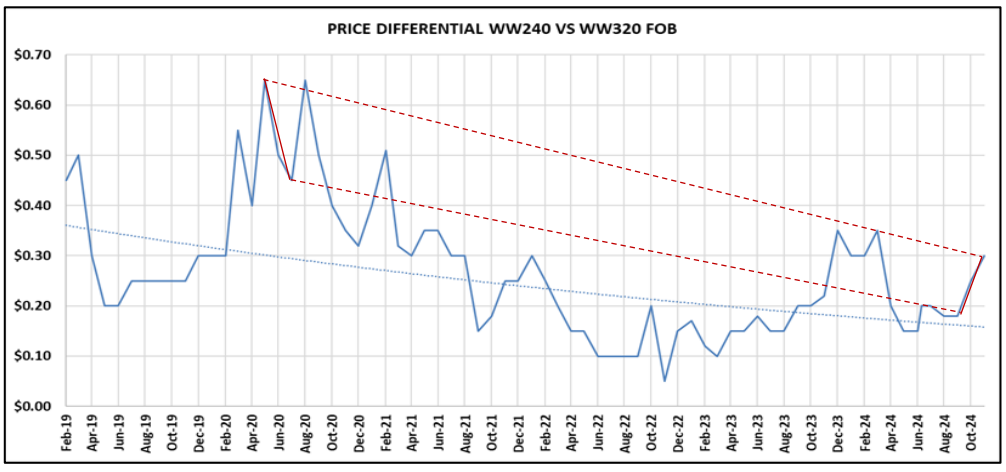
FIGURE 4.6 RCN AVAILABILITY BY MONTH 2015 VS 2024. SOURCES THE CASHEW CLUB DATABASE AND AFRICAN CASHEW BAROMETER DATABASE (ACA)



4. The advantages brought by the earlier availability of Cambodian RCN in large volumes are tempered by the fact that the trade is almost entirely conducted on immediate payment terms either cash or transfers and sometimes with advances to agents in Cambodia. This was confirmed by fieldwork interviews undertaken for this analysis. This is in contrast to the African RCN trade that is mainly financed by international traders with funding sourced in Singapore, UAE or Hong Kong. Cambodian RCN has to be purchased, paid for and stored but African RCN is delivered month by month for processing. This has created additional financial strains for Vietnamese processors particularly in a period of low sales prices and tight margins.

5. The majority of the Cambodian crop is made of large nuts in proportions that are not experienced in other large producers. This has created a situation in the market in which the supply of large nuts has exceeded any previous availability. The demand for cashew nuts was formed based on the available sizes i.e. predominantly WW320. It will take some time for the demand for larger nuts to adjust to the new availability. In the interim it appears that the premium pricing for large cashew nuts has been eroded as illustrated in Figure 4.6 which compares the differential between WW240 and WW320 cashew kernels since 2019.

FIGURE 4-7 COMPARISON PRICE DIFFERENTIAL WW320 VS WW240 FOB SOURCE ISS PRICE DATABASE



4.4 Future Trends and Potential Impact in Cambodia

The supply and demand trends as projected using the current trends in Chapter 3 indicate that there is strong likelihood that the overall position will return to surplus production assuming normal crops in any given year up to 2031. The forecast assumes that demand will return to its long-term growth trend from 2025 due to the impact of higher prices and the end of a period of "catch up" due to slow demand growth in 2022 and 2023. It also seems likely now at the end of 2024 that destination market inventories have normalised although this will not be fully clear until the first quarter of 2025.

Therefore, the change in the balance of supply and demand is likely to keep farm gate prices in check for the coming years. Cambodia, as the closest and largest supplier to Vietnam, will be impacted by this although probably less than its African competitors.

The scenario in which Cambodia has a single outlet for its crop combined with a lack of value addition and a surplus supply position in the market creates risk for Cambodian farmers. If Vietnamese processors, under pressure from poorly performing markets and amid increasing competition from African processors were to offer lower prices to Cambodian traders there is little that those traders could do other than to pass the lower prices on to farmers. This would negatively impact farm incomes especially for farmers that are wholly dependent on cashews which is a significant number based on the fieldwork interviews.

One remedy to this situation would be to diversify RCN markets. However, Cambodia is unlikely to be competitive to the only other market that buys RCN, India. Indian buyers have, over many years, sourced small volumes from Cambodia ranging from 98 to 2002 tonnes per annum over the past decade[33]. Farm gate prices and costs of transportation are too high to make India a competitive destination for RCN from Cambodia. The lack of good post-harvest practice makes buying in Cambodia more complex and costly. If this were not the case Indian buyers who source in almost every country would be more active in Cambodia.

There is a second scenario that is developing in Vietnam that may change the nature of the RCN trade in the future. Vietnamese processors have had greater difficulty in profitable processing in recent years. This is openly discussed by processors in personal interaction[34], in online interaction[35] and in the news media[36]. Some processors propose to reduce the volume processed in Vietnam due to the reliance on imported RCN and to concentrate on lower volume, higher value addition products[37]. There are examples of this already. A Vietnamese processor supplies consumer packed cashew kernels to a major retail discounter in Australia. The US retailer Price Costco offers Vietnamese packed consumer packs under its Kirkland brand. US imports of roasted and secondary processed cashews have increased by CAGR 18% over per annum since 2018 according to statistics from the US Trade Information Centre. Whilst this remains a small trade it may grow and could impact demand for RCN from Cambodia.

[33] Indian Customs Authority figures
[34] Example discussions with Prosi Thanh Long company for this study
[35] https://cptcorp.vn/the-state-of-vietnams-cashew-industry-challenges-and-solutions/
[36] Saigon Online, Oct. 2024, https://www.sggp.org.vn/tim-giai-phap-thuong-mai-cho-nganh-dieu-viet-nam-post765678.html
[37] ttps://wtocenter.vn/tin-tuc/23891-cashew-exports-promote-deep-processing-to-take-advantage-of-ftas

A third scenario that seems highly likely to develop is that Vietnamese processors or traders will construct post-harvest drying and bagging facilities in Cambodia. This would allow them to increase their influence in the supply chain, retain the value-added post-harvest and to manage the potential impact of an export tax that was based on a fixed rate per tonne. We did not find specific examples of projects under development during the fieldwork, so this remains a likely development rather than a defined trend at the time of writing.

The most realistic option to diversify markets is to develop markets for cashew kernels. This requires the building of both a post-harvest and a processing infrastructure. Indications from research[38] show that, in general, processors are more likely to support and develop relationships with producers across a range of cashew producing countries. During the fieldwork for this study, this was also apparent in interviews with Agricultural Cooperatives and individual growers. Whereas processors cannot completely protect farmers from a fall in market prices they are more likely to pay a higher price and to assist in production capacity building than RCN traders. These types of relationships are also essential to build traceable supply chains as increasingly required in target markets.

Without diversification of markets, in a worst-case scenario, Vietnamese demand for Cambodian cashew nuts would fall either in the volume required or to prices that Cambodian farmers would not find viable. This could cause farmers to remove cashew trees causing a severe reduction in income whilst newly planted crops matured and at a significant environmental cost. There is precedent for this scenario. In Cambodia in 2022, as mentioned above up to 100,000 hectares of cashew seedlings were removed due to the prospect of low prices. In Vietnam during the fifteen years up to 2017 the area planted to cashew trees was reduced from 450,000 to 314,000 hectares[39] due to more attractive options for farmers such as rubber and cassava[40]. Further back between 2008 and 2010 Cambodia's cashew area was reduced by 13.75% due to lower cashew prices that caused a shift to rubber. This followed a fast increase from 2004 to 2008 during which the area increased rapidly from 40,000 hectares to 80,000 hectares[41].

In support of market diversification, Cambodia is located close to the World's fastest growing major cashew market, China. The Chinese market has major potential as discussed in Chapter 3. Cambodia already has investment in its cashew chain by Chinese investors and has exported small volumes of cashew kernels to China. The development of the Chinese market by Cambodian exporters has high potential provided to necessary trade channels and phytosanitary arrangements are in place. Developing to supply China based on existing cooperation is an opportunity that would fit well with the need to develop markets further afield in order to create a viable, sustainable processing industry at scale.

There are also smaller markets within the region that prefer to source their cashew nuts from India. These markets focus on taste and colour as product characteristics. Cambodian varieties can meet these needs. Given that Indian cashew nuts are sold to markets such as

[38] Fitzpatrick, Competitiveness of the African Cashew Sector, Gates Foundation 2018 and Com Cashew (GIZ) projects available at https://www.comcashew.org/
[39] "Hat Dieu", Periodic Information About the Cashew Industry, VINACAS, January 2024.
[40] VINACAS based on Ministry of Agriculture information.
[41] Keo Chenda et al. Cambodian Cashewnut Value Chain Assessment Report, Heks Eper, Dec. 2019.

Japan, Korea and Taiwan at premium prices based on these characteristics these markets could be a focus for Cambodian exporters.

In summary, the current market outlook indicates a surplus position for the next 4-6 years unless demand growth significantly surpasses long term trends. Cambodia, with its high dependence on a single destination market, has a significant risk of lower farm gate incomes due to the supply/demand outlook and potentially changes in the structure of Vietnams cashew sector that may reduce the appetite for RCN from Cambodia. In addition, trends in Africa suggest increasing competition to market RCN from there. With options for diversification of RCN sales limited, the best option appears to be the development of processing.

Key points:

- Cambodia is vulnerable to market oversupply as a single destination supplier.
- Diversification of markets can reduce the risk.
- Opportunity to diversify markets for RCN are very limited.
- Diversification by marketing processed kernels is an option.
- There are opportunities in regional markets such as Japan, Korea and Taiwan.
- Increasing production in Cambodia beyond already planted trees will add to the risk.

5. Cambodia Value Chain Analysis

As outlined in the last chapter, Cambodia is among the most successful cashew producers in the World. Its rise to be one of the top three producers has been meteoric. Such growth in a short period of time has never happened before and is highly unlikely to be repeated at any time in the future.

The fast production growth has its origins in the high price period of 2015-2017 and the remarkable development of high yielding varieties that have been expertly utilised by Cambodian farmers. However, Cambodia is today a producer of RCN for export to a single market, Vietnam and may be vulnerable to changes in that market. Market conditions have changed. The very high prices of 2016-2017 are unlikely to be repeated in the foreseeable future due to the change in the supply/demand balance.

In this chapter the focus is closely on the cashew value chain in Cambodia. Practices, constraints, actors, trade and organisation are examined with a view to 1. assessing the sectors performance in Chapter 6 Status and Potential of the Cashew Value Chain and 2. developing the interventions that are proposed in Chapter 7 Recommendations for the Cashew Value Chain.

The structure of the analysis is based on the benchmarking factors identified in Chapter 4. The data, information and opinions used are based on the statistical sources, the literature review undertaken by the author and the extensive fieldwork undertaken by the Cambodian consultants in the seven provinces chosen. The fieldwork was extensive, but it was not an exhaustive statistical census of the value chain. Therefore, the fieldwork is used to test and verify other sources and to suggest courses of action, constraints and issues in the value chain. The findings were presented during a consultation workshop with value chain actors in Phnom Penh on 11th December 2024. They were generally accepted by participants during the consultative group process.

5.1 Production

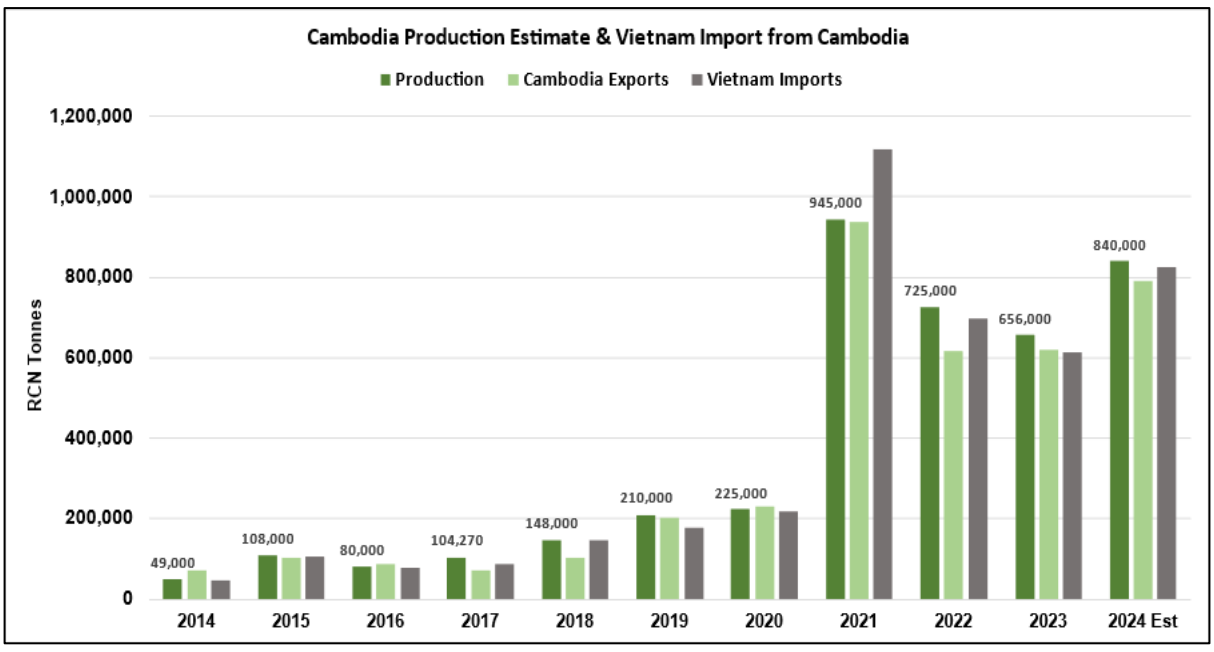
5.1.1 Volume, Yield and Area

Estimating cashew production in Cambodia has historically been a challenging task. In recent years a range of estimates have been published by several organisations including at the World Cashew Conference in Siem Reap causing confusion in the sector and impacting investment decision making. There are some good reasons for this. The fast-changing nature of production, the lack of statistical evidence as to when the new trees were planted, lack of an accurate annual agricultural census, informal trade and the scale of production are all factors that make the task difficult. There may also have been a tendency to make the estimate fit the available figures as valid comparisons were difficult.

The recent publication "Cashew Growing Area in Cambodia 2024"[42] is a significant step forward toward an accurate estimate. Its results, stakeholder feedback for this study and trade statistics were used to estimate production as illustrated in Figure 5.1. It compares the estimates of Cambodia production with export of inshell and imports to Vietnam from Cambodia.

Except for 2021, production is higher than exports from Cambodia explained by local consumption and processing which is increasing but remains at low levels. Vietnams imports are often higher than Cambodia's export figures. This is explained by the informal trade which was a factor highlighted in our stakeholder feedback, but which appears to be limited to provinces bordering Vietnam. The estimates of the crop used for Figure 5.1 broadly match the estimates of MAFF and CAC for the 2024 season. There is a 2% difference in 2022 and no difference in 2023. The crop estimates for 2024 issued in December 2024 by CAC matches the estimate calculated here of 840,000 tonnes. Vietnamese 2024 trade figures of an import

FIGURE 5-1 CAMBODIA CASHEW PRODUCTION INSHELL



[42] Department of Agricultural Land Resources, MAFF, October 2024.

of 824,158 tonnes[43] for 10 months plus the volume processed plus a small volume held in warehouse according to interviews support this conclusion.

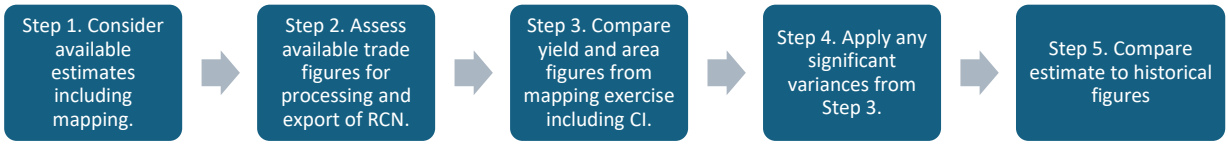
We assessed the area, yield and production figures from the "Cashew Growing Area in Cambodia 2024". The productive area in that report tends to match the estimates of stakeholders in the six provinces where AC's and producers[44] were interviewed indicating the accuracy of the estimates. The production estimate in the mapping exercise is 816,463 tonnes with a confidence interval on the high side of 853,602 tonnes and on the low side of 779,324. The estimate used here is within the confidence interval, reflects the trade figures and allows for an estimate of the volume processed and consumed in Cambodia.

The area and yields used in the cashew mapping exercise were also assessed and compared to the fieldwork data. In the six provinces there were two standout differences. In Kratie, stakeholders interviewed gave a broad range of estimates of yield with the higher end at 2080 kgs/ha and the average at 1517 kgs per hectare. The MAFF average yield figure is 2000 kgs/ha. In Ratanakiri, stakeholders estimated a range of yields 947-1025 kgs per hectare. These reflect the fact that much of the area is planted with traditional varieties and that according to stakeholder comment the high yielding varieties mainly M23 give a lower yield in Ratanakiri than elsewhere. This seems logical given the terrain, soil types and lower use of agri-inputs. The average yield in Ratanakiri estimated by using interviewees feedback is 947 kgs. This figure is significantly higher than the MAFF yield estimate used in in the cashew mapping at 680 kgs/ha.

Discussions with stakeholders during a series of post-fieldwork consultations in December 2024 found general agreement on the conclusion that yield in Ratanakiri is higher than the MAFF estimate but lower than the national average thus supporting our conclusion.

Applying the fieldwork version of the yield in Ratanakiri to the hectarage in the mapping study would bring production to 842,000 tonnes which is in line with the trade and processing figures.

FIGURE 5-2 ESTIMATING THE 2024 CASHEW CROP IN CAMBODIA



Estimate	MAFF/DALR Production	DALR CI High	DALR CI Low	Study estimate	Study High	Study Low	Average Variation
Tonnes	816,463	853,602	779,324	840,000	850,000	830,000	+/-4%

[43] Vietnam Customs Service website referenced above.
[44] Fieldwork was undertaken in seven provinces, but producers were not interviewed in Siem Reap. The six provinces covered 86% of the production and area.

FIGURE 5-3 YIELD PER HECTARE COMPARISON

Metric/Province	Fieldwork Yield Range of estimates Kgs/Ha	MAFF Yield per DALR Mapping Kgs/ha	Variance Kgs/ha	Improved varieties share - fieldwork	Comment on yield
Kampong Thom	1430-1500	1490	4%	90%	
Kratie	907-2000	2000	24%	90%	Fieldwork low estimate.
Ratanakiri	947-1000	680	39%	47%	DALR estimate too low.
Kampong Cham	1200-1800	1300	16%	97%	Poor yield in 2024 due weather.
Stung Treng	1750	1200	45%	90%+	Poor yield in 2024 due weather.
Preah Vihear	1000-1500	1400	7%	51%	The lower range was organic producers.

Note in 2021: The production estimates for 2021 found in the reports from a range of organisations cannot be explained by either trade or estimates based on the land area and yield. The very high import figures reported by Vietnamese authorities was highly doubted by Vietnamese stakeholders in interviews. In 2021 and subsequently it has been pointed out that there was a false trade reported that was allegedly related to money laundering causing import figures for cashews from Cambodia to be inflated. VINACAS reported this[45] in 2021 and the customs authority promised an investigation. We assessed the Vietnamese balance sheet for 2021 for production, imports, exports and consumption. We estimated an overstatement of cashew imports by 150-250,000 tonnes. We therefore estimated the Cambodian cashew crop at 945,000 tonnes for that year. Cambodia reported exports of 937,974 tonnes in 2021.

The area reported in the DALR mapping report is 580,117 hectares with a confidence interval of 27,710 hectares. In the seven provinces assessed for this analysis the estimates of stakeholders were 3% lower for the productive area. Earlier studies are also in broad agreement, and several are referenced throughout this analysis. The widest variation is with MAFF figures from 2022 that estimated the planted area at 652,538 hectares but it is unclear whether these included trees less than 2 years old. If, as seems likely following a contribution from MAFF during the consultative workshop referred to above, it did, the variation would be only 3%. Therefore, the figures for the currently productive area are reflected accurately in production estimates, pre-existing studies and stakeholder interviews.

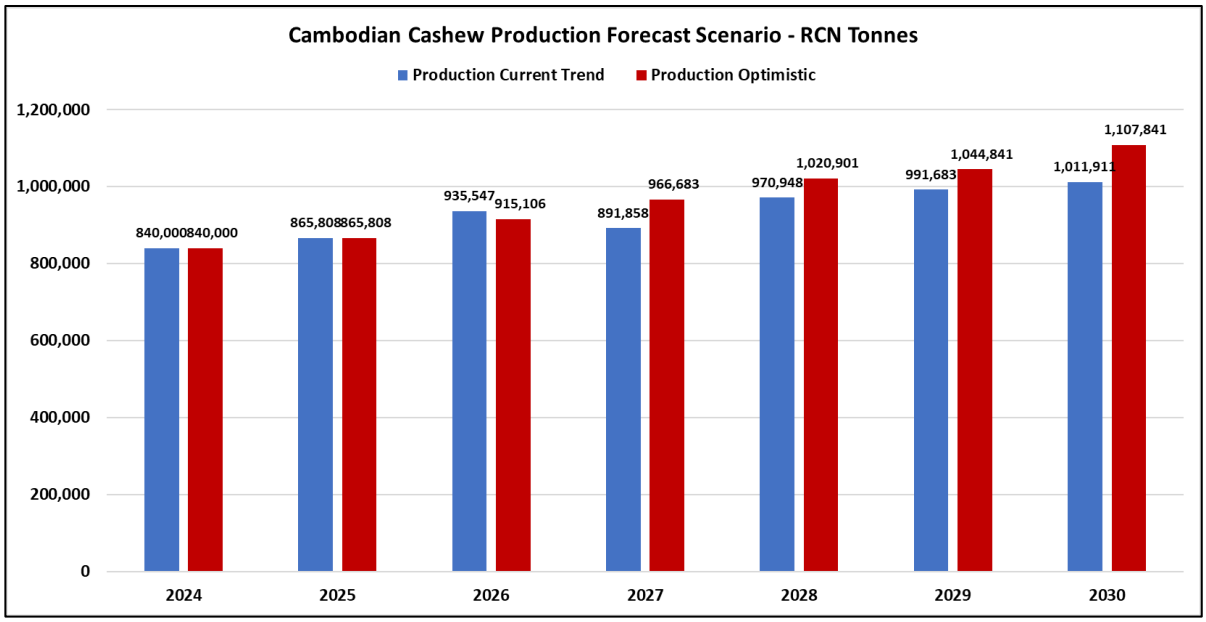
Looking to the future, a large majority of interviewees expect production to increase in future based on new trees coming into production and already producing trees maturing. When asked “Do you expect production to increase in 2025 and 2026?” every stakeholder that answered replied positively in a range of 2-5%. Most explained this by referring to tree-age i.e. new trees producing and existing trees maturing. The fieldwork interviews suggest that on average circa 7% of the total hectarage as immature in the provinces analysed. This would

[45] https://vinacas.com.vn/ly-do-nhap-sieu-gao-ho-tieu-hat-dieu-tang-dot-bien-bv2691.htm

mean that the productive area will increase to 632,000 hectares. Estimates by PDAFF[46] indicate an increase of the productive area by 8.9% and CAC estimates that 12% of the currently planted trees are as yet unproductive. Most of this area is likely to come into production in 2025 as there were few trees planted after 2021. The increase in the productive area is most likely in the provinces with younger trees that may not show in the satellite mapping e.g. Siem Reap.

Globally most cashew trees reach production maturity in 7 years with production slowing after twenty-five years. Research by the Department of Industrial Crops, General Department of Agriculture[47] shows that cashews trees in Cambodia may follow a different pattern with significant yield improvement after year 7. For example, cashew trees in Kampong Thom, the largest producing province yielded 1.5 tonnes in year 7 but had increased to 1.75 tonnes by year 10. The overall average figure in year 7 was 1.422, in line with MAFF publication, but increased to 1.684 tonnes by year 10. This is significant. It is not explained in the available study but may be the result of the greater care in cultivating cashews in Cambodia than in most other countries.
Using the estimates of production, planted area and yield estimates a forecast was prepared for Cambodian cashew production as illustrated in Figure 5.4.

FIGURE 5-4 FORECAST RCN PRODUCTION CAMBODIA



Assumptions: Current Trend

- Productive area increases by 4.45% in 2024 and 2026.
- Average yield stays consistent at 1450 kgs/ha
- Productive area increases by 2% per annum after 2026.

Assumptions: Optimistic

- Productive area increases by 4.45% in 2024 and 2026.
- Average yield increases based on General Directorate of Crops findings.
- Productive area increases by 2% per annum after 2026.

[46] Chaya et al, Is Cambodia the World's Largest Cashew Producer? DALRM, General Directorate of Agriculture.
[47] Results of cost study on cashew production 2024, General Department of Agriculture, Dept. of Industrial Crops.

In a presentation made during the consultative workshop, MAFF presented and analysis that predicted that cashew production would reach 1 m tonnes in 2028 and increase more slowly from that point. This is in line with the finding of this study as outlined above.

Cambodian production is concentrated. The top two provinces by production volume account for 45% of the 2024 production and the top eight for 93%.

The range of estimates for, as yet, unproductive new plantations from the fieldwork suggests that increased production is most likely in Siem Reap, Stung Treng and Kampong Thom. In Ratanakiri there is likely to be an increase in the area planted to high yielding varieties especially M23 variety. This will increase the yield especially if older trees are replaced with the high yielding varieties. Yields are lower for all varieties in the province as mentioned above.

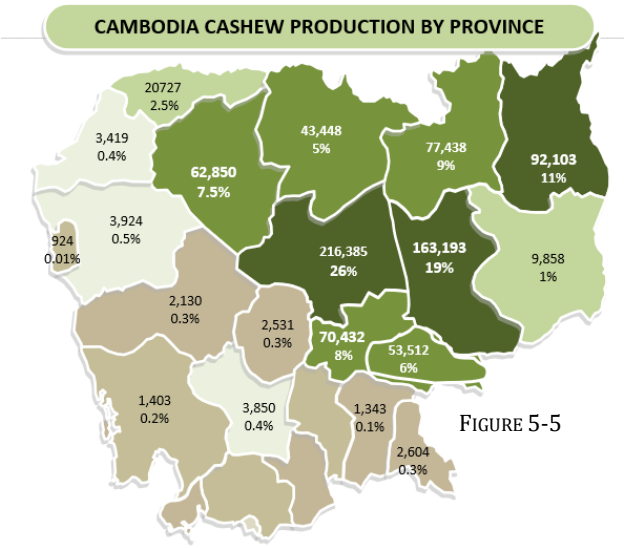


FIGURE 5-5

The forecast calculation indicates a CAGR rate of 4-6% for the next six years. Based on this relatively conservative forecast, Cambodian production will reach 1 million tonnes by 2029 or 2030. This will consolidate the countries position as the second largest producer after Cote d'Ivoire (1.2 m tonnes 2024) and ahead of India (782,000 tonnes 2023).

Cambodia has some of the best climate characteristics for growing cashew trees, but climate change can negatively affect cashews[48]. Several reports and fieldwork feedback indicate that the experience of more volatile weather conditions has increased in the growing areas due to climate change. Interviewees spoke of high temperatures, lack of rain and heavy downpours during flowering. It is therefore likely that production will continue to be volatile in the coming years. Several interviewees suggested that their yield in 2024 was below expectations due to weather conditions. There is not conclusive proof for this on a wider level and yields appear

Quotes from growers and AC leaders

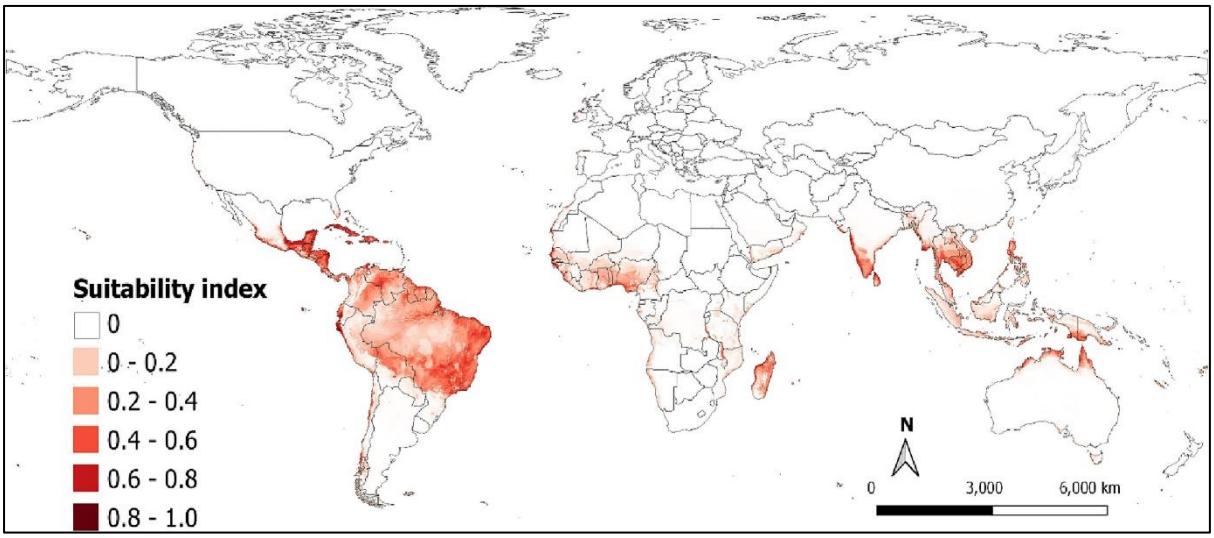
"The weather condition in last few years was very extreme, too many rains, very dry and no rain, and fog that bring white mini insects. It required to check the plants daily, by no intervention within 3 days, the harvest is gone." AC leader Stung Treng.

"These 3 years the weather affects to cashew nut crop, especially during Dec and Jan when cashew start flowering, and the morning dewdrop contains (salty) which damage the flower and could not bear fruit." Provincial advisor, Ratanakiri

[48] Rupa, Impact of Climate Change on Cashew and Adaptation Strategies, Directorate of Cashew Research (India) 2013

to have been in line with past experience on average However, it would not be surprising if production spiked upwards in any of the [49] coming years given ideal growing conditions.

FIGURE 5.6 CLIMATE SUITABILITY FOR GROWING CASHEW TREES SOURCE: REGE AND LEE



Cashew planting in Cambodia could exceed the forecast rate. Only 51% of the "Highly suitable" land is planted to cashews according to the General Directorate of Agriculture mapping referred to above. There are an additional 5.10 million hectares identified as "Suitable". However, the planting of cashew nuts to that scale would flood the market with large cashew nuts, increase dependence on cashews as a source of income, reduce biodiversity and increase deforestation. In most countries cashew nuts are grown on lower quality land for their resilience and low maintenance. The Cambodian model which has been highly successful has been to plant higher yielding varieties on better soils with high use of inputs. Therefore, production costs are higher and farmer profitability more sensitive to price. This is discussed further in the next chapter.

Current global demand growth rates as outlined in Chapter 3 indicate that the market would not absorb the volumes that would be produced based on current trends causing a major price fall and potentially an inability to sell the quantity produced. In view of the impact on the market price, it seems unlikely to be a fruitful strategy to sacrifice food crops and other tree crops to plant cashew trees in large quantities at this time.

Whilst Cambodia is likely to be able to sell its current and expanding production at prices that are economically viable, either as RCN to Vietnam or as kernels to diverse markets, a repeat of the kind of expansion seen from 2018-2022 would be likely to undermine the economics of cashew growing in Cambodia.

Key points:

- Cambodian cashew production is estimated at 840,000 – 850,000 tonnes in 2024.
- Production is likely to increase in the coming years at a rate of 4-6% per annum.
- Fieldwork for this study reflects the MAFF/DALRM mapping exercise.

[49] Rege and Lee, The socio-environmental impacts of tropical crop expansion on a global scale: A case study. Biological Conservation Vol. 280 April 2023 https://www.sciencedirect.com/science/article/pii/S0006320723000617

- A major expansion of the production volume as seen in 2018-2022 could undermine the viability of cashew growing in Cambodia.

5.1.2 Production Yields and Quality

Cambodia leads the World in terms of yield per hectare. The average yield in the DALRM mapping report is 1422 kgs per hectare. Figure 5.6 compares average yields per hectare to the major producing regions.

The high yield in Cambodia is partially due to the basic factors such as an ideal climate and a range of suitable soils but these factors are present in many producing countries without reaching the yield levels of Cambodia. Based on the interviews with stakeholders and a review of the existing literature there are several key additional factors that contribute to the higher yields:

1. Cashews are planted on a range of soils in Cambodia including higher quality soils where they might not be planted in other countries. For example, sandy loam soils in Kampong Thom are ideal for cashew trees. It remains to be seen over time if the cashew market prices will support the use of higher quality land for cashews, but it is certainly a factor in the current yields.

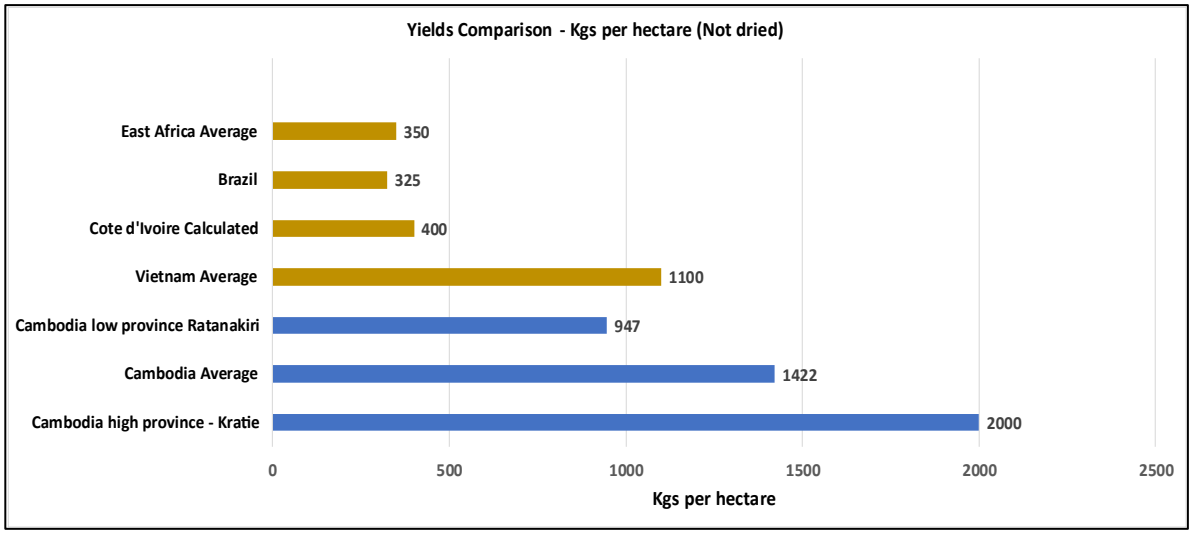
2. The widespread use of improved, high yielding varieties such as M23. Estimates varied from 70-97% on the use of these varieties. Only in Ratankiri is there a significant use of older varieties according to fieldwork findings. Other examples of the use of improved seedlings are found only in Vietnam and in some parts of India. In Africa the most common source of planting stock has been locally procured unselected seeds.

3. Inputs are widely used. Spraying is common to combat pests with drone technology now regularly employed, fertilizer is used, chemicals are used to combat threats such as anthracnose, mildew and boring pests. Production orientated respondents to the fieldwork questionnaires confirmed these facts.

4. Cashew trees in Cambodia appear to be correctly spaced and planted at a tree density that encourages thriving trees and higher yields. In many countries especially in some African example's trees are planted at high densities up to 400 per hectare causing lower yields.

5. Cambodian farmers are more likely to be professional in their approach to cashews. They are more likely to rely on cashews for their livelihood compared to farmers in other countries where cashews may be regarded as a secondary or tertiary activity with trees planted for shelter or to use marginal land. Many years of low farm gate prices may be the reason behind this type of cashew production in West Africa for example.

FIGURE 5-7 YIELD COMPARISON



The Cambodian cashew sector has performed well. However, the advantages of climate suitability cannot be taken for granted due to the impact of climate change. Interviewees were asked about growing conditions in recent years and if they had noticed any impact of climate change. Anecdotally, many reported problems with extreme temperatures, heavy unseasonable rains during flowering and heavy dew during the flowering period. There were a lower number of reports of long periods without rain. All of these factors are likely to reduce production as whilst cashew trees are drought resistant, yield of nuts and fruit is not[50]. A discussion with an Indian expert in production for this study suggested that high yielding trees may be more vulnerable to the impact of climate change than the mare hardy traditional varieties. We cannot find any substantial research on this aspect. It could be vital subject of research in future.

There may be evidence that the level of chemical treatment for pests has increased. Reports from interviewees described widescale and frequent use of pesticides suggesting an overall higher use of chemicals in Cambodia than in any other cashew sector except Vietnam. This will be discussed further below.

An additional potential impact of climate change that may bring long dry, hot periods is an increased risk of forest fires. This is one of the most significant risks in West Africa [51]. It causes the loss of thousands of trees every year. In Cambodia with monocropping common and larger cashew farms the impact could be significant for the sector and catastrophic for farm families that only grow cashew trees.

5.1.3 Quality

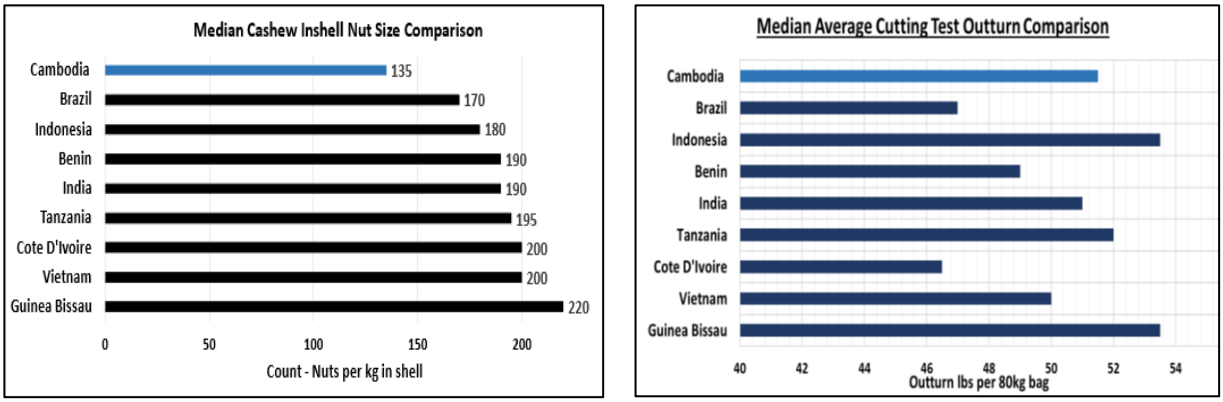
Cambodian cashew nuts are of high quality.[52] They score highly on the two key metrics of quality, outturn yield[53] and nut count. Outturn yield is the weight of usable cashew kernels per unit weight of RCN. It is usually expressed in imperial lbs per 80-kg bag of RCN. In Cambodia a percentage measure is used more widely. A high outturn would be 50 lbs plus or 28%. Nut

[50] "Strengthening the climate resilience of agriculture in Cambodia and Viet Nam" project (2021- 2024), GIZ https://www.giz.de/en/worldwide/95504.html
[51] Fitzpatrick. J, Competitiveness of the African Cashew Sector, Gates Foundation, 2019.
[52] For a simple explanation of cashew quality https://cashewplus.com/cashew-calculator/#calculator
[53] Yield is used in two senses in this document on farm yield – how many kgs are produced per hectare and outturn yield as in this case.

count is the number of inshell nuts per kg expressed as a count e.g. 185 nuts per kilo. Cambodian cashews based on the literature, discussion with Vietnamese processors and the fieldwork interviews lead the world.

The comparison in Figure 5-7 shows that Cambodian cashew nuts from the improved varieties such as M23 produce the largest cashew nuts in the World. In terms of outturn Cambodian, the same variety is in the top four Worldwide. However, there are marketing issues with large nuts. During the fieldwork, Intersnack, a processor in Vietnam and major snack food manufacturer that buys RCN in Cambodia, indicated a preference for traditional varieties as they are geared to make products that are mainly WW320 grade, the most common size of cashews. The challenge of marketing larger cashew nuts will be discussed below.

FIGURE 5-8 RCN QUALITY COMPARISON



An aspect of quality that is less well documented is the processing characteristics of Cambodian cashew nuts. By this is meant the more detailed processing results rather than simply outturn and sizing. There had been some doubt expressed by processors during the World Cashew Conference 2024 as to the "peelability"[54] of Cambodian RCN. To discover the processing characteristics the only option is to talk with individual processors.

During the fieldwork twenty-one Cambodian processors were interviewed. They were mainly small processors often with manual peeling. Three were medium/large processors of which two were operational. We also talked to two major Vietnamese processors that between them in total, processed over 35,000 tonnes of Cambodian RCN in 2024 and to an Indian veteran processor that had bought Cambodian RCN in 2023 to test. All three have mechanised processes.

The following is a summary of their observations:

1. Cambodian RCN outturn is good, and size of the kernels is large mainly 240 and 180 grades.
2. Shelling: Good for machine shelling but machines must be well calibrated for larger nuts.
3. Peeling: Cambodian processors: Good results often manual peeling.

[54] Ease of removal of the testa by machine i.e. the proportion peeled on the first run through the machine. IT is important as on each peeling run more kernels are broken.

Vietnamese processors: Excellent peeling characteristics only 10-12% not peeled. This is a very strong result with factories often reporting up to 30% not peeled on some origin raw material.
Indian processor: Some difficulties with mechanised peeling. Skin adherence high.

4. All: Kernel colour and taste is good.
5. Problems:
   Vietnam: There are more Dessert Wholes (darker colour, spotted and discoloured). Taste is fine but appearance is off putting for consumers.
   Vietnam: More black marks on the kernels.
   Vietnam: Some lots are high moisture causing a yellow-coloured kernels. Drying is very important as the nuts have a high oil content.

The comments from all processors indicate that the basic characteristics of Cambodian nuts are good for processing. The problems that are mentioned are all related to post-harvest handling. This is probably why Cambodian processors do not experience the problems in the way that Vietnamese or Indian processors do. The colour, spotting and discoloration as well as the Indian experience with peeling is related to drying of the nuts. As we will outline below, post-harvest handling is a key aspect that is causing some processors difficulty with processing. Interestingly a Vietnamese processor suggested that there is a problem of handling the volume and the infrastructure available in Cambodia.

Key points:

- Yields on farm are the highest in the World in widespread production.
- Cambodian RCN of new varieties and traditional varieties is of high/very high quality.
- Cashew trees and yields are vulnerable to climate change.
- Problems with quality are related to post harvest handling.
- Marketing high volumes of large nuts has challenges.

5.1.3 Farmer Numbers and Type

Cashews are grown by smallholders worldwide. Cambodia is not an exception, but Cambodian cashew farms are larger than typical smallholder production in the sector Worldwide. The Cambodia Agriculture Survey 2020 reported about 236,000 holdings reported cashew production or 11.6% of total farm holdings. Based on 2024 production that would give an average farm size of 3.5 hectares which can be used as a guideline rather than a validated statistic as the sector has developed since 2020.

The following table gives an overview of farm size estimates from the existing literature.

FIGURE 5-9 FARM SIZE FROM THE LITERATURE REVIEW

Scale/Study	JICA 2022	HEKS EPER 2019	GIZ CRAS 2023[55]
< 1 ha	-	16%	
< 2 ha	-	38%	38%
< 5 ha	80%	78%	78%

[55] Benchmarking the Cambodian Cashew Sector, GIZ Cras, Presentation and literature review.

> 5 ha<10 ha	22%	-	
> 10 ha	6%	6%	6%

We analysed the Cambodian Agriculture Census 2020 (CAC) holding numbers by applying the number of farms to estimated production and yield levels. These were then compared to the fieldwork interview data with a view to assessing 1, if the information provided in the literature was still accurate and 2. to assess whether or not the situation had changed since the reports were compiled.

Figure 5-9 indicates that farm size remains within the parameters of the studies but that farms maybe larger on average than they were in 2019 or 2021 especially in the major producing provinces. Again, it is important to emphasise that the CAC and the DALRM Mapping report are regarded as statistical data and the fieldwork interview reports are used to test, verify or cast doubt on the findings. We are not suggesting that a production interview group of less than 200 people offer conclusive evidence but it does offer opportunity to observe how the sector may be changing.

The calculations in Figure 5.9 indicate that:

1. The average farm size is 3.10-3.35 hectares based on a weighted average. This tends to confirm that the situation outlined in existing reports persists.

2. Cashew farms are larger in the major producing provinces.

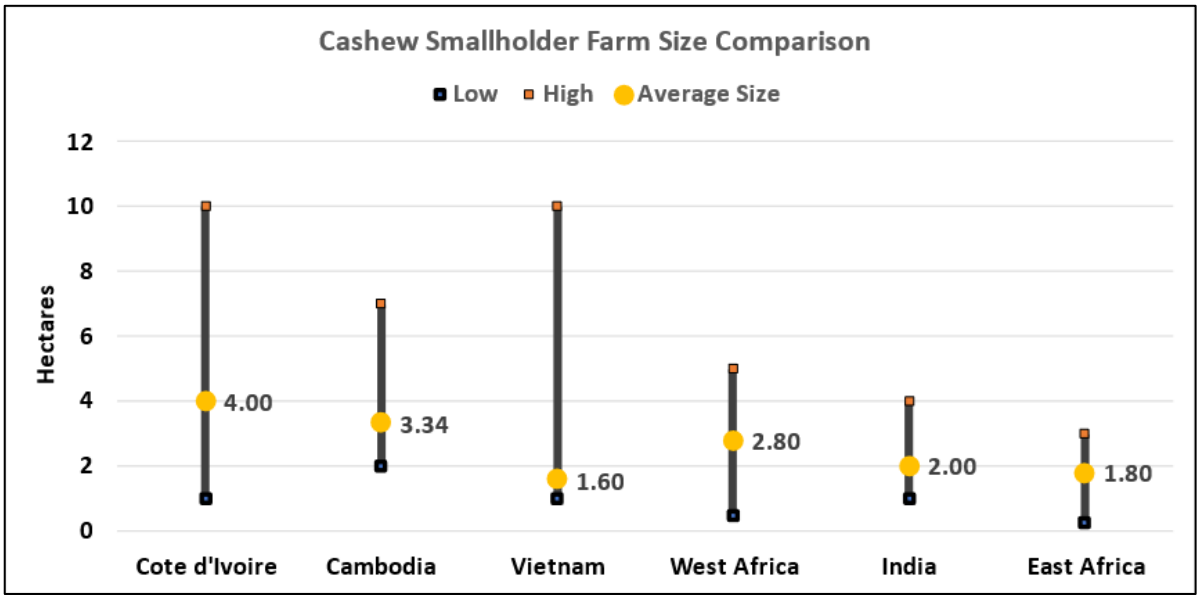
3. That there has been an increase in the number of cashew farms since 2020 except in Preah Vihear where there may have been a decrease, or the CAC overestimated the number of farms in 2020. It could also indicate a significant number of farms that are not yet producing.

FIGURE 5.10 FARM SIZE CALCULATED AVERAGES

	CAC 2020	Fieldwork	Average Farm Size			
	Number of Farmers	Interview farmer numbers (respondents estimates)	Calculated using Yield. t/ha and CAC	Calculated using Area planted and CAC. Ha	Indication from fieldwork. Ha	Fieldwork range of farm size. Ha
Kampong Thom	33000	*36962*	4.40	4.48	4.00	3-7
Kratie	22000	*38100*	3.71	4.66	2.69	2.2
Ratanakiri	32000	*31971*	3.04	3.04	3.04	2-3
Stung Treng	12000	*10000*	4.96	3.69	4.43	5-7
Kampong Cham	20000	*20520*	2.71	2.33	2.27	1-3
Preah Vihear	21000	*14292*	1.48	1.38	3.00	3
Total/Weighted Average	140000	*151845*	**3.09**	**3.34**	**3.17**	**2-7**

The Cambodian average farm size is compared to other major producers in Figure 5.10.

FIGURE 5.11 AVERAGE AND RANGE COMPARISON FARM SIZE CASHEWS – Calculated for this analysis.



Cambodia ranks highly in terms of the average smallholder farm size. Compared to the main production regions it is second ranked after Cote d'Ivoire. However, the average size of Ivorian cashew farms must be considered in the context of the very low yield on these farms at an average of 400 kg/ha or less than 30% of the Cambodian average. A typical Cambodian farmer might produce 4.75 tonnes on the farm whereas an Ivorian farmer would only produce 1.6 tonnes.

Ownership may also differ in African farms. Whereas farm families may own the land there is often no document of title and security of tenure may be jeopardised if conditions arise that might make the land attractive to the state or investors. In Cambodia, the CAC 2020 reports ownership rates from 96-100% in the major cashew producing provinces.

Commercial farming of cashews is not usual in Cambodia but there are some larger or commercial farms. According to the fieldwork interviews, commercial farms are generally large family-owned farms that vary in size rather than very large "plantation" type units. In Kampong Thom interviewees reported 20 ha as a typical size. The equivalent in other provinces was Kampong Cham 20-30 ha with one large 200 ha farm, Stung Treng five farms of 50-150 hectares and Ratanakiri about 5% of farms ranging up to 50 hectares each. There were no commercial farms reported by interviewees in Kratie. Information from Preah Vihear is unclear but there are some commercial farms including one attached to a processing unit. From the literature the position of planting cashew trees in order to lay claim to land is mentioned going back to the early expansion of the cashew planted area. This applied both to smallholders and commercial or state actors. Overall commercial farming plays a small role in Cambodia for cashews similar to the experience worldwide.

Key points:

- According to the census 236,000 holdings are engaged in cashew production.
- The number may have increased a little since the census in 2020.

- Average farm size is circa 3.35 hectares with larger farms in the major producing provinces.
- Farm size is larger than in most countries. This can be viewed as making farmers more resilient or alternatively more exposed to the risk in the cashew sector.
- Commercial farming remains a minor factor in cashew production.

5.1.4 Growing cashews in Cambodia

Cambodian cashew farmers are efficient producers compared to their competitors overseas. This is indicated by the yield and practices on farm. Cambodian cashew farmers have mainly planted high yielding varieties with traditional varieties that were imported from Laos and Thailand up to 40 years ago persisting in Ratanakiri and to a lesser extent in Preah Vihear. Traditional varieties are preferred by some buyers.

FIGURE 5 ON FARM PRACTICES

Establishment	Kampong Thom	Kampong Cham	Kratie	Stung Treng	Ratanakiri	Preah Vihear
Improved Varieties **M23** **Other improved** **Traditional**	85% 12% 3%	90-95% 5-10%	90%	70-90% 10-30%	47% 8% 45%	90-95% - 5%
Tree Density	150-200	120-140 240-280	200	200-220	205	190
Planting method/material	Seedlings	Seedlings/Grafts	Seedlings	Seedlings	Improved: seedlings Trad: seeds.	Seedlings
Early intercropping	Cassava	Y1 Cassava Y2 Vegetables Y3 Rice	Rice Maize Soya	Cassava Corn	Maize Vegetables.	No information
Harvesting method	Fall and gather	Fall and gather	Fall and gather	Fall and gather	Some picked	Fall and gather
Soil types	91% Sandy loam 9% Red sandy clay	Red soil and black gravel – high yielding. Sandy soil	Lowlands black soil and sand mix. Uplands- red soil and sand.	Dark soils.	Red highland	Red soil on well drained land. Laterite soils – less fertile.

Orchard establishment and growing practices were reviewed based on FAO best practice recommendations[56] for orchard establishment and a range of recommended practices[57] from

[56] FAO, Good practices for the establishment of a new cashew farm, 7461, 2012
[57] https://cashew.icar.gov.in/wp-content/uploads/2017/04/cashew-cultivation-practices.pdf

India. It appears that the practices on Cambodian farms are well within the recommendation and guidelines. It is therefore not surprising that cashew trees are thriving on these farms.

Tree density, varietal choice, planting material used and the harvesting method as well as climate and soil types all comply with the general recommendations. There may be some questions that arise on tree density. The 7 m x 7 m[58] or 8 m x 8 m spacing is proven to be effective for high quality trees on good soils according to Indian research. However, on poorer soils a high density has been shown to offer higher yields[59] and may be a subject for research in Cambodia. Overall, it appears, based on the interviews conducted for this study and a review of the literature, that cashew orchard establishment practices and the initial growing phase are done well in Cambodia.

FIGURE 5.13 CASHEW FARM MANAGEMENT PRACTICES – FIELDWORK

Management	Kampong Thom	Kampong Cham	Kratie	Stung Treng	Ratanakiri	Preah Vihear
Spraying Pest prevention	2-5 times Oct-March	1-3 time per month pre flowering about 20 times per year	Nov -February – three times	2-3 time before and during flowering	Not used by traditional growers. Modern varieties sprayed.	Sprayed 7 times
Equipment/services		By hand and tractor	Machine	Drone service & by hand	-	-
Use of Fertilizer	Annually	4 times per year NPK and natural	Once June - Aug NPK and Organic liquid	Once in September	Low usage	May-June use NPK 3,1,1
Other treatment	None	Plant growth stimulant	None	Spray hormone before flowering	None	None
Pruning[60]	Annually June	Annually July	No report	Post harvest	Annually from 5 year old	Annually Aug/Sept
Weeding/floor clearing	Chemical twice per year	None	None	None	None	None

[58] ~ 200 trees per hectare
[59] Olubode et al, Evaluation of production practices and yield enhancing techniques on productivity of cashew, Fruits 73 (2) https://doi.org/10.17660/th2018/73.2.1

[60] So,S, Pruning and Sanitation and Bordeaux Mixture, CRAS (GIZ), 2022.

Pests	Tea mosquito Thrips Bollworms (nuts borers) Mealy bugs Mildew	Tea Mosquito damages buds/Spraying Pseudococcidae	Tea Mosquito Helopeltis Stem and root bores Neoplocaseder us Worms and Anthracnose	Stem and root borers.	Flowering - the fungal disease, salty dew, has the most dew in January.	Fungal disease.
Chemical inputs used	UT70, Crab, Emida70 Supertrint, Abametin, Emametin, Clofefos, Acid Timprite, Fuypersen, Emamedaclotrite herbicide 48, liquid fertilizer SMV. ROHAT Agrotech Angkor Green Agro chemical LRD pesticide D57.					
Inputs supply	Inputs are sourced for local merchants or retailers with a small proportion through ACs and a very small proportion supplied by NGO projects.					

Concerns may also arise as to the level of land clearance and deforestation involved in establishing the cashew planted areas. This will be reviewed below. There is also a broader question regarding whether or not the cultivation of cashews on level ground, high quality soil is likely to offer the best financial return for growers. That question is beyond the scope of this analysis but warrants further investigation.

Cashew farmers in Cambodia are more proactive in tree management than their competitors in most other countries. Regular spraying to protect the trees including the development of drone spraying services and the use of fertilizer were almost universal practices among the interviewees during the fieldwork. The diseases noted by interviewees during the fieldwork reflect the literature on the sector and broadly experiences elsewhere.

Chemical inputs appear to be used more widely in Cambodia than in other producing countries. This may be a concern in the future. If improved high-yielding varieties require the heavy use of inputs to maintain high yields, then growers must be well informed on their use. There is the potential for the development of a situation in which pesticide residues block access to target markets. This does not need to be a widespread problem to cause disruption. A few incidences can cause additional costs through mandatory testing on arrival or ultimately import bans. The reputational damage that might be caused to the sector could be catastrophic as experience shows. In 2017, high levels of chemical residues caused major problems for Vietnams pepper exporters[61]. There are other examples including incidences of the detention of cashew kernels from Cote d'Ivoire in the EU in 2023 due to pesticide residues exceeding maximum residue levels. This is a high focus aspect for European, Japanese and Korean buyers. It is likely to increase in importance and potential impact for buyers from China and other countries in the future.

[61] https://betaen.vietnamplus.vn/vietnams-pepper-faces-stern-quality-challenge-post107007.vnp

Almost all farmers, according to our research and the literature, source their inputs from local merchants or retailers. These outlets are supplied by Cambodian distributors of products mainly from Vietnam but also from Thailand and China. The direct sale to producers without ACs or other groups in between places the onus on the supplier to inform the customer (the farmer). Some have developed good programmes in this area but many have not. Implementation at local level is challenging.

The importation of chemical inputs is regulated by MAFF, Cam Control and the customs authority[62]. Implementation of regulations in this activity are difficult. To ensure market access, the national regulations should be in line with the regulations of the target markets. It is not reassuring to see Chlorpyrifos-Methyl mentioned in CAC production literature. That product is banned in Europe, Thailand and the US among others[63]. Use of such a product is a threat to the agricultural exports of Cambodia to key markets. The enforcement of regulations, well-managed distribution and the training of growers in the use of chemicals would mitigate the risk.

Tree age is an important indicator of future production, the potential for tree diseases and on-farm yields. Cashew trees yield increases as they mature and usually declines after 25 years as discussed above. As part of the field research for this analysis, producers, cooperatives, and other actors were asked about the tree age in their locality and province. The information collected varied from well based, informed information to opinions based on local experience. Therefore, the figures generated from these should be used as good indicators as opposed to statistical data. The existing literature was also assessed for indicators on tree age. Studies by Heks Eper and GIZ CRAS already referenced above were especially relevant.

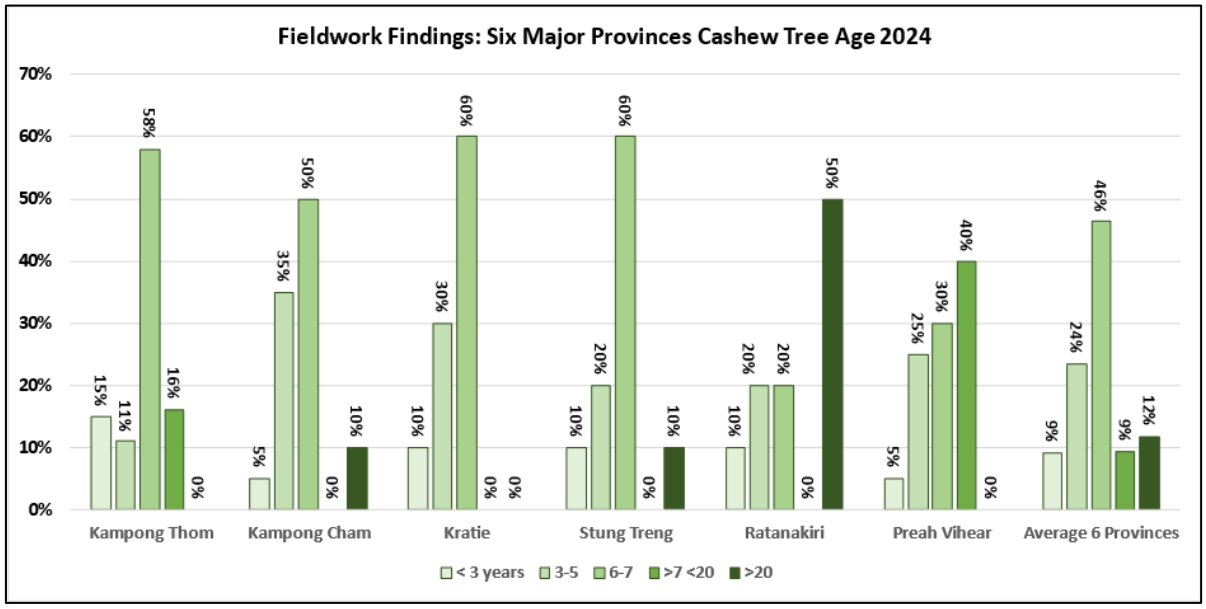
Taking the information from the six provinces research and reviewing the history as outlined both in planted area estimates and production trends we assessed the cashew tree age profile in the six focus provinces. These six provinces are strong indicators of the national situation as they account for 80% of the planted area of trees of more than 2 years old and in 2024 about 79% of production.

The impact of tree age on future production can be indicated as follows:

1. < 3 years old – not yet in production.
2. 3-5 years old – in production but not yet at optimum yields.
3. 6-7 years – coming to mature yields.
4. 7-20 years – at full production.
5. Older than 20 years – likely to reduce yield in next 5-10 years.

[62] CIRD Cashew production, processing and commercialisation in Kampong Thom and Preah Vihear provinces Field Assessment Report, September 2019.
[63] https://food.ec.europa.eu/plants/pesticides/approval-active-substances-safeners-and-synergists/renewal-approval/chlorpyrifos-chlorpyrifos-methyl_en

FIGURE 5.14 TREE AGE – FIELDWORK INDICATORS



Based on tree age Cambodian production will increase in the coming years even if no new trees are planted. In the subject provinces, an estimated 9% of the trees are not yet producing. This is close to the CAC estimate of 12%. However, in the projections used in Chapter 4 we used a more conservative figure as an unknown number of immature trees may be lost before reaching maturity. Research in African countries indicates losses of 15% in grafted trees[64] and as high as 50% when seeds or seedlings are used. A minimum of 24% of trees in the age group 3-5 years have not reached full production whilst around half the trees are in the period of optimum production. Only about 12% of Cambodian cashew trees are likely to yield fewer cashews in the next 5-10 years. Most of these are in Ratanakiri with significant minorities in Kampong Cham and Stung Treng. Projections made in Chapter 4 take these factors into account.

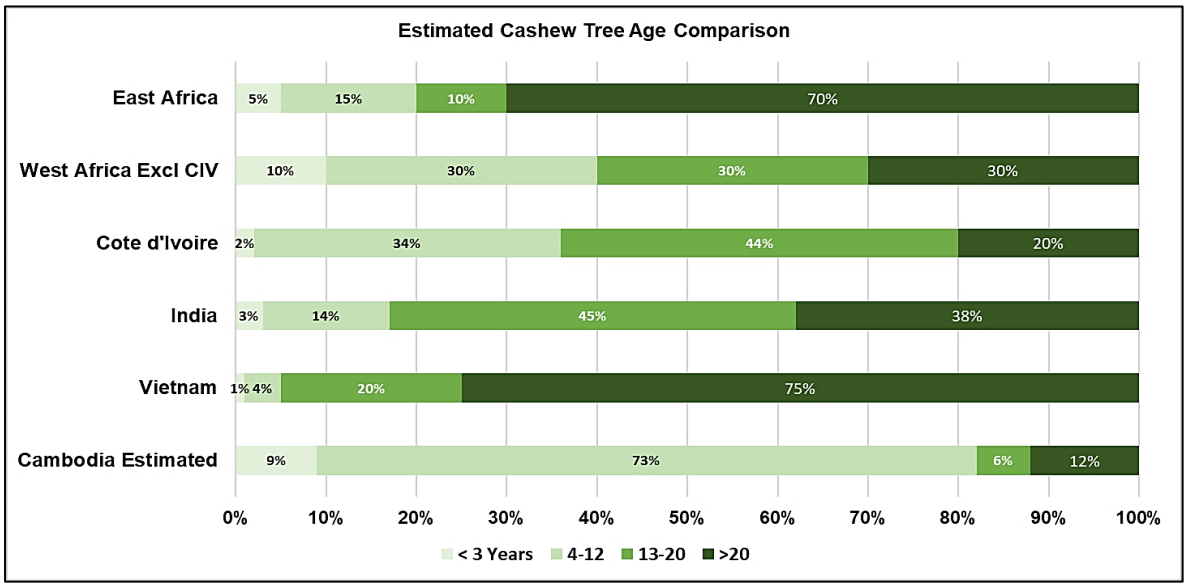
A comparison with other major producing regions indicates that Cambodia, not surprisingly given production trends, has the youngest cashew tree stock in the World as illustrated in Figure 5.15.[65]

The tree age indicates that that the renewal of cashew trees e.g. top working of senile trees that have passed optimum production is likely to be limited to Ratanakiri for the foreseeable future. There is a case for further investigation on the optimum production period for cashew trees in Cambodia focussed on M23 and other high-yielding varieties. As discussed, and referenced above, the yield of these varieties may not conform to the patterns seen elsewhere.

[64] file:///C:/Users/iss/Dropbox/R&D/Cashews/Growing%20Cashew/FINAL-%20CASHEW%20NURSERY%20MANAGEMENT%2001.pdf
[65] Fitzpatrick, J, Benchmarking the Cambodian Cashew Sector GIZ CRAS, 2023.

It also indicates that production is likely to increase in each major province provided that farmers are incentivised to maintain their cashew production by profitable pricing and market outlets. It may indicate that the fast growth in Cambodian cashew production is over at least for the next four to six years. The age profile of competing production countries indicates that there will be continued growth in production in West Africa, growth at lower rates in India and slow growth or decline in Vietnam and East Africa.

FIGURE 5.15 INTERNATIONAL TREE AGE COMPARISON



Key points:

- Cambodian cashew orchard establishment is efficient and in line with good practice.
- Cambodian farmers manage their trees well compared to other countries.
- There are concerns regarding the application of chemicals to cashew trees.
- Cambodia has a young cashew tree population indicating production growth in the future.

5.1.5 Gender and Cashew Production

Gender inequality is a subject that has had much attention in the cashew sector worldwide usually focussed on unfair and discriminatory practices in cashew processing units. There is less written about women in the production segment, and it is difficult to find any research on gender specifically in the Cambodian cashew production sector. Gender equality is an issue addressed in the National Cashew Policy 2022-2027 and the National Strategic Development Plan 2014-2018 that preceded it.

Research by GIZ published by Cashewinfo.com suggests that "*Women form more than 80% of the labour force involved in collecting raw cashews from the farm. Yet female ownership of the farm is estimated at less than 10%*"[66]. Direct experience with farmer groups and processors in West Africa confirms that this finding accurately reflects the situation there. The

[66] https://gender-works.giz.de/women-leadership-in-the-cashew-value-chain/#:~:text=Women%20form%20more%20than%2080%25%20of%20the%20labour,ownership%20of%20cashew%20factories%20is%20less%20than%205%25.

Heks Eper value chain study, Cambodian Cashew Nut Value Chain Assessment Report, 2019 found that women were well represented in membership of agricultural cooperatives in Cambodia quoting a membership rate of 60% but this does not necessarily infer equality or fairness as the numbers engaged are small relative to the total number of cashew farmers. More general research on gender in the Cambodian agricultural sector found that 85% of agricultural households have access to land but that only 27% of the land was owned by women. It was also noted that women struggle to have land registered in their own name due to traditional cultural norms and lack of information[67].

In an effort to gauge the current situation we asked interviewees about the number of women farmers in their regions. We accept that the responses are indicative of the situation only. The question asked may be interpreted by the respondent in several ways although the primary respondent group was agricultural cooperatives that were represented by more than one person in meetings. We recommend further and well-resourced research on this topic.

The findings in the fieldwork interviews in answer to the question "How many farmers are women?" were as follows:

Kampong Thom	40%
Kampong Cham	20-30%
Kratie	49%
Stung Treng	51%
Preah Vihear	40%
Ratanakiri	40%

These results are reflected in the ILO study Diagnostic of informality in the Cambodian Cashew Nut Industry[68] which found over six provinces an average of 43% women farmers.

The responses indicate that women are highly involved in production in the cashew sector. This appears to be a far greater involvement than in other major producing countries in which women primarily play the role of gathering the harvest as part of unpaid family labour. It does not infer ownership of the land or otherwise as this was not seen as a question that could be accurately answered by most respondents.

Key points:

- Cambodian women may be more active and better represented than women in other producing countries in the cashew sector.
- Women are not equally represented as farmers or likely to be equally treated yet.
- There is need for research on Gender and cashew production.

5.1.6 Harvest and Post-Harvest Practice

Post-harvest handling has been identified as an area in which practice in Cambodia differs to most cashew producing countries. Trade in RCN is mainly in undried nuts.

[67] Phuong, The Important Role of Cambodian women in the Agriculture Sector, Parliamentary institute of Cambodia, 2018. https://pcasia.org/pic/wp-content/uploads/simple-file-list/20190128-The-Important-Role-of-Cambodian-women-in-the-Agriculture-Sector_PHUONG-Leapheng.pdf

[68] Thun Vathana et al, Diagnostic of informality in the Cambodian cashew nut industry, ILO 2024.

ICAR, the Indian Directorate of Cashew Research has identified five post-harvest reasons that cause cashews to be damaged[69] . They are:

(I) Insect attack (on harvested nuts especially pre-drying).
(ii) Harvesting of immature nuts i.e. picking from trees instead of allowing to fall
(iii) Improper drying of harvested nuts.
(iv) Delay in drying the freshly harvested nuts.

FIGURE 5.16 POOR POST-HARVEST HANDLING IMPACT ON KERNEL QUALITY.

Damaged kernels – Pest damage, CNSL damaged, poorly dried, or over dried, badly handled, or packed.

Immature kernels – Early harvested, poorly dried.

Spotted kernels – Insect damage, drying problems, CNSL damage.

Source: Authors research conducted for a processing feasibility study, 2019. Some of the problems illustrated here mirror comments by Vietnamese processors in relation to Cambodian cashew kernels.

Good post-harvest handling and storage practices are essential for cashew nuts. In shell cashew nuts lose their quality if they are not handled properly in the post-harvest period. This firstly involves correct separation of the nut and apple to ensure that no part of the apple is left attached to the nut. Drying is the next stage. Ideally this should be done immediately the mature nuts are gathered. Most cashew nuts Worldwide are sun dried over three days being taken in at night, stored in jute[70] bags and turned during the day to avoid uneven drying. Initially this is done by farmers with a final drying by the trader or processor. Drying is essential to allow the kernels to mature and to fix the CNSL so as to prevent it damaging the kernels. The use of jute bags is also essential to allow the circulation of air. The use of plastic or polypropylene bags is not recommended.

Properly dried and stored cashew nuts can be kept for up to a year and even longer with minor quality deterioration. Improperly dried or stored nuts will lose quality quickly becoming lower yielding, damaged by CNSL or moisture making them costlier to process and yielding fewer white whole nuts. Ideally drying should be carried out on a hard surface such as concrete

[69] ICAR, Post Harvest Technology, harvesting of cashew nuts. https://cashew.icar.gov.in/faq-pht/
[70] Also known as burlap or gunny bags.

although drying can also be done on tarpaulins laid on the ground spread out at a maximum of 20 kg per square meter[71].

In the field research for this analysis there were common findings across all six provinces The experience of producers, ACs, traders and processors were similar in relation to post-harvest handling.

Producers reported that they sold the nuts without drying. In general, they were not conscious of the moisture content when selling and try to sell the nuts as soon as they are harvested. This practice has evolved, according to traders, as farmers need to pay debts for inputs and farm labour and to support their own day-to-day expenses. In some provinces the system appears to be that very small lots as low as 20 kgs are sold every day to local traders for cash payment.

There may also be a reluctance to dry the cashews as it reduces weight. The experience in most countries is that farmers will dry the nuts and do so properly if they are rewarded for doing so by higher prices. In Cambodia small traders and intermediaries reported that they buy and sell the nuts without drying. The practice appears to have evolved due to an emphasis from both farmers and buyers to move the nuts quickly and to recover the investment in production as soon as possible. The practice appears common to all scales of farmers. Price volatility may also have played a part in the development of the current practice.

Respondents reported that the nuts are packed in polypropylene or used fertilizer bags. Storing undried cashew nuts in this type of bags risks damage to the kernels. Jute or burlap bags were reported as available for import but not easily accessible locally.

In general, the key metrics of cashew quality as identified above, outturn, nut size and moisture content are not considered by growers or traders in the way they are in other countries when trading cashew nuts at the farm gate. There are provincial variations. Quality appears to be a more discussed factor in Kampong Thom where variety, colour and condition influence price more.

Traders report that they do consider these factors, but this is done by identifying the variety and assuming that all nuts conform to the varietal pattern. This may mean that some farmers receive lower prices than they might, but it is likely that others receive relatively higher prices than they should. The impact is that there is low awareness of quality, and that price is determined by supply and demand in a commodity style market. This is reflected in a quote from a farmer who said, "*traders say quality is low even when it is high*" or "*middlemen are trying to find any reason to reduce the price*." This results in a situation where the incentive for farmers to improve quality is low.

Trader's comments on quality tend to reflect the procurement system. They point to issues of mixing of varieties and quality, foreign matter and high moisture. These are all issues that typically relate to poor post-harvest handling. Processors also report that they mainly buy wet RCN during the season and dry it at the processing plant. Several processors reported that they also buy from traders during the season and later in the year they buy small volumes from traders that have dried and stored the nuts. Surprisingly, based on experience in other countries, Cambodian processors are less likely to test the nuts on arrival at their storage

[71] FAO, Guide to harvesting and post-harvest handling of cashew nuts, ID 7467, 2012 https://openknowledge.fao.org/server/api/core/bitstreams/fbb465d0-5663-43ed-a9c0-52cd414555b1/content

facility. A float test[72] rather than the full cutting test was mentioned by some. Others purchased based on the variety without testing of individual lots.

In summary, RCN is traded from farm to first trader (local) without drying. It is then traded on to the larger traders or Vietnamese agents that set up buying points in Cambodia. The bulk of the material is shipped to Vietnam by truck before drying. It is dried in Vietnam at warehouses with concrete drying yards for onward sale to processors or is sold directly to the few processors that buy in Cambodia.

The impact of this marketing method is to reduce the price at the farm gate in Cambodia and effectively moves even the most basic value addition to Vietnam. It is likely that on export of 824,000 tonnes in 2024 that a simple value addition opportunity estimated at US$ 25-35 per tonne is lost or about US$ 20 – 30 million. Properly dried and bagged cashews make a higher premium than the drying loss. This was pointed out by Uon Silot, President of the Cashewnut Association of Cambodia in a newspaper interview in 2022[73]. The system also increases "harvest pressure" on price. Buyers are aware that farmers must sell quickly and will offer prices accordingly.

As a result of the system in place there has been little need or effort to develop post-harvest infrastructure. Farmers do not have drying areas or tarpaulins as they do in other countries. Local traders rarely have warehouses or drying yards. Regional traders or assemblers tend to have small "transit" size warehouses and temporary or small drying yards. This means that as processing develops processors would have to build an infrastructure to ensure the quality of raw material.

There are other impacts. The quality of Cambodian RCN is lower than it could be. The problems outlined by the Vietnamese processors and discussed above confirm this. This is reflected in market prices. There is also less incentive for farmers to organise as they do not have a need to cooperate to establish post-harvest handling centres. This, in turn impacts their ability to market in groups. Finally, the lack of post-harvest handling facilities and the impact of later drying on quality is not a positive platform for the establishment of a processing industry in the country. It means that processors must invest in the infrastructure in Cambodia compared to other countries where it already exists.

Production practices in Cambodia are advanced but post-harvest handling is less developed than in other countries. This may be to the fact that farmers need to sell quickly for cash. However, it seems unlikely that the three days taken to prepare the cashews by drying and bagging would materially change the farm economy when farmers have already waited a year for the crop. It seems more likely that these practices have developed when Cambodia was a small grower close to Vietnam. They are continued under the system in which the first trader must turn the goods over quickly due to lack of own funding and thin trading margins.

Key points:

1. Post-harvest handling in Cambodia is less developed than in other countries.
2. As a result of export of undried cashews value addition and product quality are reduced.

[72] The nuts are immersed in water. The "floats" are nuts that may have low outturn and be immature.
[73] Ibid

3. The post-harvest system in Cambodia is a constraint on the development of processing.

5.1.7 Supports for Farmers

Despite the scale of production, a developed government policy and the activities of several development projects over many years, farmers report low levels of support for production. They report some positive initiatives with limited geographical penetration such as technical training by CAC, Heks Eper farmer training, IVY organic production support, GIZ CRAS activity in Kampong Thom and Kratie and production training by FAO in 2020. A review of projects suggests positive results but at a limited scale.

There are many projects in Cambodia, but awareness of training programmes appears to be low among producers. Government extension support services appear to be under resourced and ineffective in influencing cashew production. A provincial government agricultural officer commented that there is a lack of a legal framework for the support of farmers. Some interviewees commented that there is a lack of awareness of farmers needs among NGOs.

There can be no doubting the level of project activity and interest in the cashew sector amongst development organisations. However, according to interviewees, it appears that this is not currently well directed at producers. This is not surprising given the success of production in Cambodia over the past decade. However, as suggested, above that success should not be taken for granted. Issues such as post-harvest handling, on farm value addition and the use or potentially overuse of inputs are issues that may require attention. The challenges of climate change as the risk from pests, more frequent extreme weather events and changes in the growing seasons impact on production. These factors are more concerning in a volatile market environment with most likely a surplus supply situation and a high dependency of many farm families on cashews for their livelihood.

Direct support for farmers is important but difficult to deliver without the existence of a farmer organisational network. There are cashew agricultural cooperatives in Cambodia, but they cover a relatively small number of growers according to our research. There is a low incidence of ACs being involved in the delivery of capacity building to farmers and very low levels of activity in the supply or advisory services on inputs and the sale of RCN. There are examples of support to cashews ACs but not enough to create positive change in the sector or to build competence in the ability to operate in the markets. The Ministry of Agriculture, Forestry and Fisheries has been active in promoting farmer organisation, but greater resources and more extensive programme are required.

Overall, in comparison to their competitors in African countries Cambodian farmers receive lower levels of support possibly because the success in production has tended to bring the focus on the development of processing.

5.1.8 Constraints on Production

The following is an assessment of the constraints on production and the economic viability of production based on the field research and the existing studies/literature.

Several studies have referred to a cost disadvantage in farming cashews in Cambodia. The cost of producing cashew nuts in this case refers to the variable costs of production for a 4–

5-year-old cashew trees based on average yields. Costs vary widely per country and in Cambodia by province, so the comparative approach is to calculate costs per tonne before drying by taking the total costs and applying the yield factor.

There are three sources used. The GDA, Department of Industrial Crops, Results of cost study on cashew production 2024[74] is the most extensive and up to date study. It is based on 330 samples spread over eight provinces. The Heks Eper value chain study[75] of 2019 is the second source. The final source is the field research done for this study which interviewed 119 organisations in production and a further 26 in support production organisations

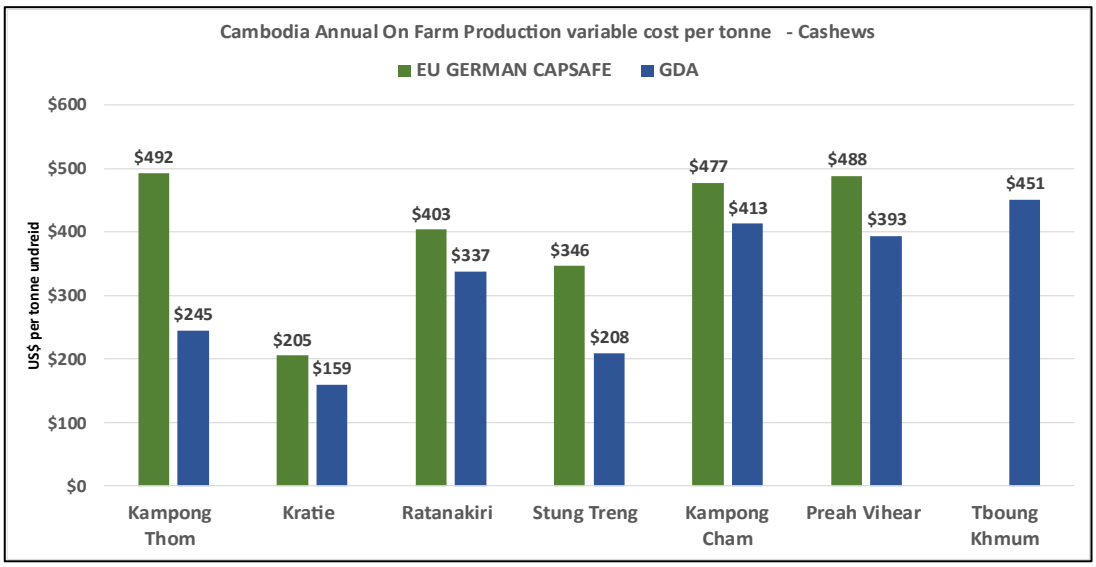
The comparison was conducted by taking the findings of the GDA study with the research findings in Figure 5.17 and the Heks Eper study finding of 2019 in Figure 5.18. In general, the findings of the three studies are in line with each other. The GDA study estimates costs lower than either of the other two. The differences are consistent across five of the six provinces that this study researched except for Kampong Thom where there is a wide difference between this studies field research and the GDA results. This could be due to a range of factors including the sample size, the questions asked and differences in the type of farmers interviewed. Kampong Thom has a mix of new and established farmers.
The annual operating costs were then compared with production costs drawn from a range of studies in other countries including work done by the GIZ project, The Competitive Cashew Initiative in West Africa[76] in Figure 5.18.

Figure 5.17 compares the GDA, Dept. of Industrial Crops report estimates with the interview findings. It shows relatively uniform variation in four of the six provinces suggesting that the questions asked may have varied. In Kampong Thom and Stung Treng the variations are wider, as mentioned above, and may warrant further research for differences between types and scales of farmer. This analysis allows us to assess the accuracy of the comparisons made in Figure 5.18

Based on a comparison of the average costs of production (three Cambodia estimates average $410/t) with the average of West Africa and India there is a US$ 68 / tonne difference or 20%. Only in the GDA average alone does Cambodia have a cost advantage. This comparison has considered the better yield per hectare in Cambodia. The quality in Cambodia in value terms is similar to that in India but higher than most origins in West Africa. Offsetting the cost disadvantage until West African processing is developed is the additional cost of moving West African RCN to processing plants in India and Vietnam. This is reversed once the nuts are processed in Cambodia for target markets in the Western hemisphere as the cost of moving the finished product from Cambodia to those markets is higher.

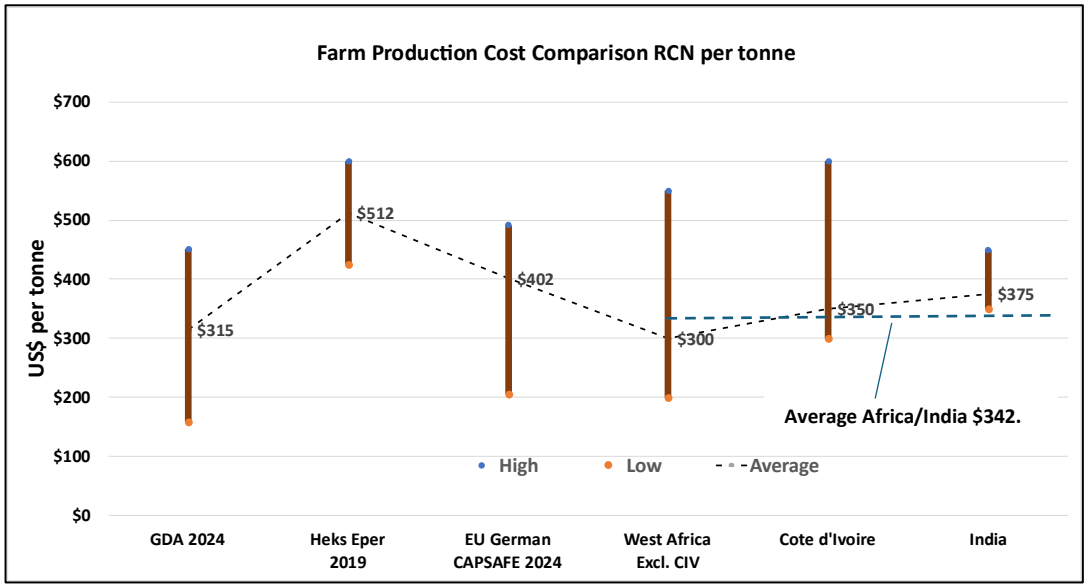
[74] General Department of Agriculture, Dept. of Industrial crops, Results of cost study on cashew production 2024.
[75] Referenced above.
[76] The current stage of this project is known as MOVE Com Cashew https://www.comcashew.org/

FIGURE 5.17 – FARM COST OF PRODUCTION CASHEWS RCN PER TONNE



Note EU-German CAPSAFE did not conduct fieldwork in Tboung Khmum

FIGURE 5.18 – ON FARM PRODUCTION COST INTERNATIONAL COMPARISON



The cost of production per tonne although higher in Cambodia compared to other countries should not be a constraint on production if target markets are in Asia but may be once Cambodian processors are competing with African processors for markets in the West.

The second aspect of cost is the establishment cost. The GDA study estimates year 1 costs per hectare to establish a cashew orchard at US$ 456 per hectare. Whilst this appears to be a good investment looking the long-term return over 25-30 years it is significantly higher than the equivalent cost in African countries at $200-260 per hectare. The cost of entry is more influenced by the cost of land than any other factor. Interviews when asked about the cost of land quoted cost ranging from US$ 1,500 to US$ 12,000. The high cost of land in the major producing areas is likely to have been a driver of extension in the lower land cost provinces. Where land costs are high it is likely to mean that farmers have significant debt. This was

reflected in the answers to questions about the use of cashew money. Most producers said that they used the money partially to repay debt ranging from 10% to 50% of the sales revenue. This could leave farms in high land cost areas vulnerable to the volatility of the cashew market price.

Based on the discussion here on costs and the other aspects above the identified constraints are illustrated in Figure 5.19.

FIGURE 5.19 PRODUCTION CONSTRAINTS CAMBODIAN CASHEW SECTOR

Practice	Markets	Financial	Inputs & Infrastructure
Lack of on-farm post-harvest value addition.	Absence of market competition and diversification.	High production costs.	Lack of post-harvest infrastructure for drying and handling.
High use of inputs with low levels of training and information.	Market price volatility.	High cost of entry.	Poor extension services and infrastructure.
Lack of extension support and capacity building programmes.	RCN market does not reward higher quality.	Difficulty accessing financial services.	Low information on inputs /relying on suppliers.
Planting cashews without consideration of best crop for the soil and location.	Absence of linkages to customers/processors.	High cost of financial services.	Low level of farmer organisation and low capacity of cooperatives.
Climate change			
Increased extreme weather risk, Higher incidence of pests, fungal disease and salty dew. Longer periods of drought. Production model not structured to cope with climate change.			

Key points:

- The Cambodian cashew production model of high inputs, high yield, high quality is exposed to volatile markets and lack of market diversification.
- Costs are higher than other producing countries but offset for the export of RCN by location, yield and the quality of the cashews produced.

5.2 Commercialisation and Value Addition

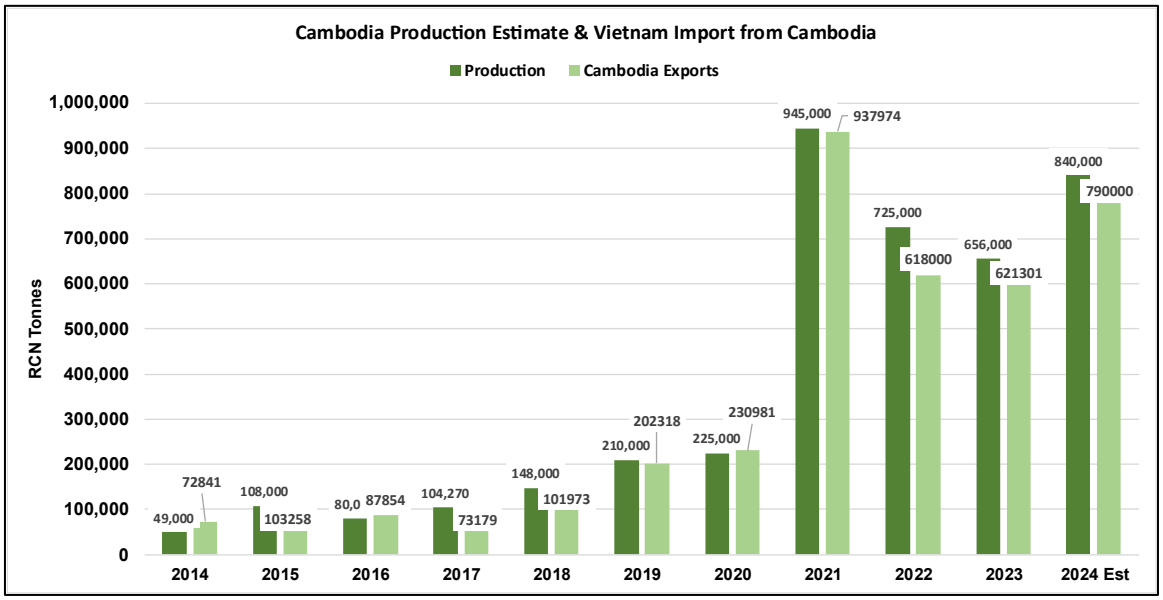
5.2.1 Traded and Processed Volume Trends

The primary market for Cambodian cashew nuts is the export of RCN to Vietnam. The trade has grown with the crop at a CAGR of 32% over 10 years with the big step up in 2021. In 2023, exports of RCN accounted for 94% of production slightly down from 95% in 2022 based on Cambodia's export statistics. The vast bulk of exports now go through the formal channels but some informal trade persists at relatively low volumes. There have been exports to other countries. In 2023 China is recorded as purchasing 2,000 tonnes and India bought 1,300 tonnes. In 2024 exports to India appear to have stopped again. As mentioned above, it will

always be difficult for Indian buyers to compete on price with the near neighbours due to export and shipping costs.

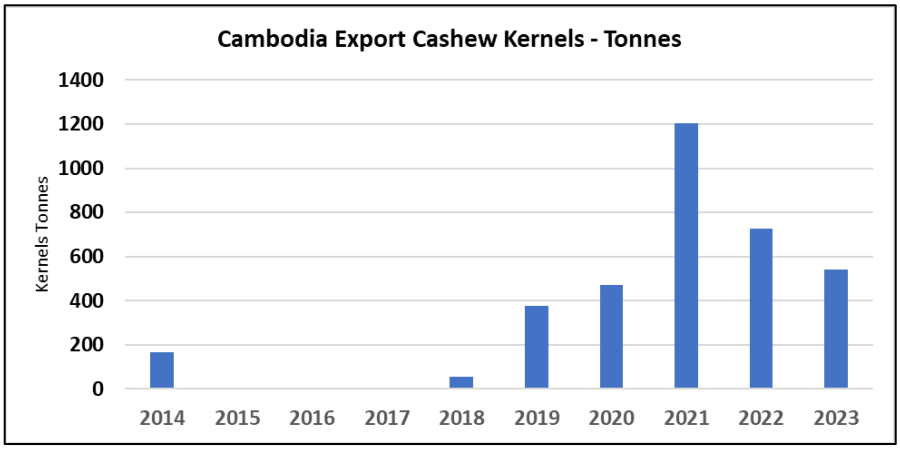
Figure 5.2 shows the trend in exports and compares production and exports. There are anomalies in the figures. Up to 2018 exports were a lower proportion of the crop. This is probably accounted for by the scale of informal trade during that period. In 2024, there is a difference of about 30,000 tonnes between Cambodian export estimates and Vietnamese import statistics[77]. This figure may reconcile by the end of the year. The key conclusion is that Cambodia has only one country as an outlet for its cashew crop and there are no realistic alternatives in the RCN market.

FIGURE 5.20 CAMBODIA PRODUCTION AND RCN EXPORTS



Cashew kernels exports remain at low volumes although the trend is upward if the surprisingly large figure for 2021 is disregarded as perhaps it should be in judging the trend. They were lower in 2023 at 539 tonnes mainly due to a drop in trade with China. At such low levels the loss of a single order could change the figures, so care is needed in drawing conclusions.

FIGURE 5.21 CASHEW INSHELL EXPORTS SOURCE: UN COMMTRADE WWW.COMTRADE.ORG

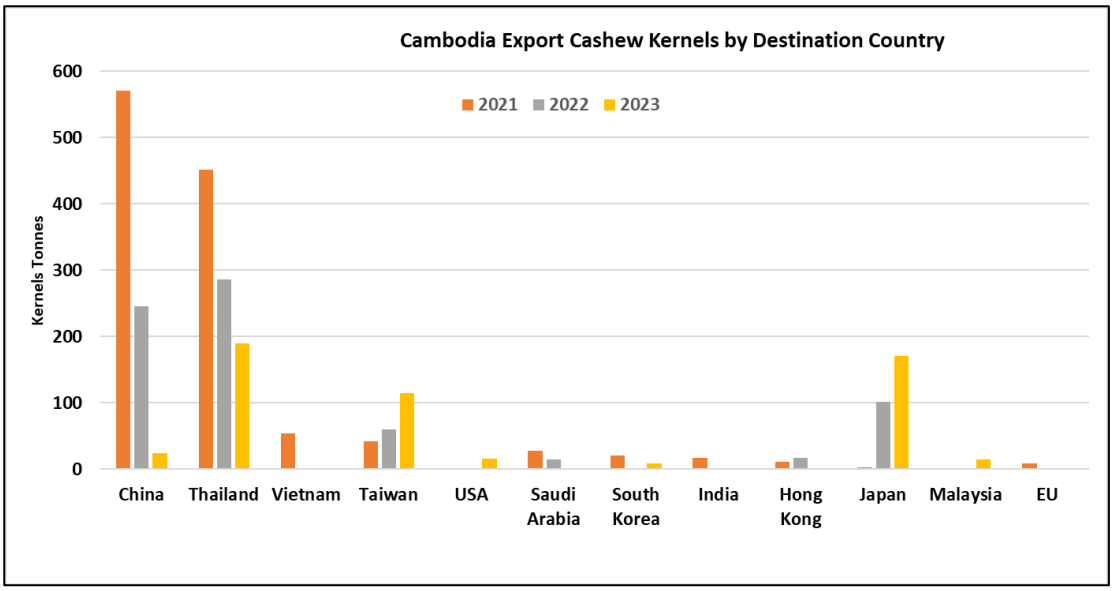


[77] See Chapter 4 for more discussion on these differences.

Nonetheless there are positive signs as a range of high value markets have bought Cambodian cashew kernels albeit at low volumes. Of particular interest are the sales to Japan, Saudi Arabia, South Korea and Taiwan as these regional markets tend to buy higher quality and pay higher prices. New sales to the EU in 2024 for bulk packed large cashew kernels and strong buying interest for organic and conventional consumer packs indicate the potential of that market.

The low volume is clearly related to the processing capacity available. Discussions with European buyers of cashew kernels in the course of the research for this study confirm their interest in Cambodia as a source of supply. There are issues around the available of sufficient kernels to justify suporting cashew processors in Cambodia and in defining markets for large cashew kernels as premium grades in a market that has been mainly for WW320 grade. Given the investment in processing in recent years, exports are expected to pick up strongly from 2025 onwards.

FIGURE 5.22 SOURCE: UN COMM TRADE



A calculation based on production and exports calculates processing in the country at 18,131 tonnes in 2023 yielding approximately 4,170 tonnes of kernels. This figure is in line with CCF estimates. Given that exports were at 539 tonnes the domestic market is estimated at 3,631 tonnes. This estimate seems too high based on the expected per capita consumption in Cambodia. This will be discussed again below.

5.2.2 Post Harvest Handling and Marketing

There are two marketing channels for cashew nuts in Cambodia. The export of RCN by road to Vietnam for processing and the sale to Cambodian processors for processing and export or consumption as cashew kernels.

Cambodia's exports of cashew nuts inshell (RCN) find their way through a network of traders[78] that effectively operate as service providers trading on thin margins, with low levels of speculation and financed by a mixture of their own funds and buyers' advances. The goods

[78] To make identification clear we will refer to "trader collectors" as the first stage of the chain and to "trader assemblers" for the consolidating operators that assemble larger volumes for export or onward sale.

are purchased by collectors, assembled by larger traders and then delivered to the border gateways where they are taken over by the Vietnamese trader or processor. The main gateways are in Kratie (Treapeang Srae) and Tboung Khmum (Trapeang Plong, Smach). Both are close to the major processors in Binh Phuoc in Vietnam. Lower volumes pass through border points in Ratanakiri (Yadav) and Mondul Kiri (Lapake). There are large drying yards and warehouses on the Vietnamese side of the border where traders and processors dry and re-bag the nuts for onward delivery to processors or to hold in warehouse for later sale.

The RCN export trade is largely financed outside the financial services sector and often informally. In this system, 610,000 – 820,000 thousand tonnes of undried cashew nuts finds its way to the key border points and into Vietnam for processing every year. This system works efficiently and is low cost. It is seasonal and involves very little interaction or exchange of information between actors other than the immediate counterparty at any point in the chain. There is no cooperation to improve the channel or the quality of the product although some examples of traders supporting farmer development were identified in Kampong Thom. There is little sector identity and low levels of trust except perhaps between farmers and their local trader collector as they may be neighbours or doing business for several years.

The procurement of RCN by processors is a more complex process. Processors tend to want to work with farmers or farmer groups. They share interests in quality and improvement. There are more likely to be contract farming arrangements, advance payments, quality premiums and cooperation on training or capacity building at the farm level often with the cooperation of NGOs. Despite these interests, processors in Cambodia buy the bulk of their needs through local trader collectors as the farmer organisation varies between provinces and most agricultural cooperatives are not capable of conducting business. They find it difficult to work with farmers due to lack of farmer organisation and in some cases, when farmers are organised, there is a lack of administrative and financial capacity at the cooperative level. Processor procurement accounted for about 3% of the crop in 2023[79].

Therefore, the primary channel for the trade in cashew nuts at the farm gate is through local trader collectors that are active in cashews during the season and may be farmers or traders in other products for the rest of the year. Local traders are part of the community and for this reason there tends to be a level of trust that does not persist as the product moves up the chain toward processors abroad. These local traders buy wet nuts from the farmer, pay in cash, assemble marketable volumes and sell on to larger assemblers or less frequently, Vietnamese agents. They can be collectors travelling from farm to farm collecting a few hundred kilos per day or can have a village base receiving from farmers or buying from mobile collectors. In terms of scale, they vary across the provinces, but all fulfil the same role of taking small quantities as harvested and delivering them to larger traders. Some trader collectors may operate as agents for larger trader assemblers usually with cash advances to finance the operations.

At this level the nuts are not dried and there is rarely any testing or quality analysis other than visual inspection and the knowledge of the individual collectors of the product produced by each farm. The mobile trader collectors usually do not have a warehouse and those operating from village bases need only small storage areas as they sell the cashews on each day.

[79] Calculated from processing analysis below.

Collector traders operate on a small cash float with immediate cash payment to farmers and from larger trader assemblers. Trading margins are very tight. In interviews, margins were reported from US$ 12.50 (50,000 KHR) to US$ 25 (100,000 KHR) per tonne or 1-2%. The business runs on fast turnover of as high a volume as possible. The typical purchase size at this level may vary from 20-250 kgs which will be sold on quickly by mobile collectors or consolidated into lots of 3-5 tonnes by village-based trader collectors.

Farmers organizations and agricultural cooperatives play a minor role in the commercialisation and marketing of cashews. Even in provinces like Kampong Thom and Kampong Cham where agricultural cooperatives involved in cashew nuts are relatively stronger than in other provinces, interviewees in all three segments (production, trading and processing) reported that up to 90% of the cashew nuts are marketed through local trader collectors. Only in Kampong Cham and Preah Vihear were ACs mentioned as having an important role in marketing.

At the next stage of the chain, trader assemblers tend to operate from a fixed premises with a small warehouse facility. They will, more than likely, trade in a range of agricultural products switching to whatever product is being harvested and is in demand e.g. rice, cassava, soyabeans. They do not dry or re-bag the nuts during the season, but larger operators may hold back a few hundred tonnes, dry it and store it for sale later in the year when they hope prices will be higher or they can sell on to local processors. These traders will assemble into larger lots and deliver to the border crossing points on trucks usually loaded with 30 tonnes. In Ratanakiri traders reported using large trucks to transport 50 tonnes at a time. Traders at this stage may be relatively small with volumes of 3,000-5,000 tonnes or very large with 10,000 tonnes plus. One interviewed trader claimed to have traded 30,000 tonnes in 2024.

Quality is checked at this point as the Vietnamese buyers or local processors relate the price to outturn, nut count, moisture content, foreign matter and variety. Traders report that they encounter problems of admixture e.g. stones or cashew apple, infestation (when the nuts are left lying undried at the farm) and mixing of good and bad quality nuts. They take the risk on quality if the product they offer is lower than expected.
Trader assemblers report financing their business through a mix of their own funding, advances from buyers (30-50% was mentioned) and private credit from family or associates. There may be bank financing in some cases of well-established businesses with property to offer as collateral. Traders reported that banks will finance cashews using the cashew nuts as collateral but that is impractical at this point as the nuts are sold on quickly. Payments for consolidated lots are by bank transfer from the Vietnamese buyers.

There is market risk as prices are volatile but only for very short periods as the nuts are quickly moved to the buyers. Interviewees reported profit margins on single deals in a range of US$ 50 – 80 per tonne or 4-6%. Profit margins, according to traders, have been under pressure in recent years. The business model is to trade as much volume as possible turning over money during the season. If the funds can be turned over four times, then gross profit margins move toward 15%. One trader reported margins of 15-30% on the annual trade.

The are hybrid business models at this stage of the chain too. Trader assemblers may lease their facilities to Vietnamese buyers and operate as agents or in cooperation with a single agent. Vietnamese traders may set up their own buying points in leased warehouses facilities

for the season. This may be a growing feature as described above. In a further variation, there are also areas where local trader collectors in border provinces sell in Vietnam and Vietnamese collectors come into Cambodia to buy. This type of trade is usually informal and unregulated.

Key points:

- The primary market channel is the export of RCN by road to Vietnam.
- Trade is handled by a series of traders operating on thin margins.
- The trade is mainly financed outside the financial services sector.
- The post-harvest infrastructure is in Vietnam.
- The Cambodian cashew farmers are almost entirely dependent on Vietnamese traders and processors.

5.2.3 Cashew Processing and Value Addition

Cashew processing is in its early days in Cambodia. There are positive signs. There is a long history of small-scale processing for the domestic and small-scale export in consumer packs. The new larger factories are investing in the latest semi-mechanised processing equipment from Vietnam and for certain parts of the process from China. Research for this study involved interviews with twenty-one processors. The international consultant has experience coaching an additional seven that were not interviewed. This gave about a 65% coverage from which to gather information and understand the processing sector in Cambodia. CCF were also helpful in checking and commenting on the figures.

In assessing the processing situation in Cambodia, it is important to note that there are many projects at initial feasibility stage and that some of these will inevitably not come to be realised. The criteria used here is that the plant is operational or that construction has started. Cashew factories may take a long time to be constructed and a longer time to reach capacity. The most optimistic outlook, based on ongoing interaction with new processors worldwide, is that the earliest a factory could reach capacity is four years after initial commissioning of the installation. Therefore, in this analysis, a factory such as the CSNC Agriculture Co Ltd in Kampong Thom is included as “capacity” as construction is underway although the factory is far from ready to commence operations according to reports and interviews. On the other hand, Unique Noble Trading, a large scale Cambodian owned factory planned for Kampong Thom is not included as construction is not far enough advanced.

Overall, we estimate that Cambodia will have by the end of 2024 capacity to process 72,625 tonnes or 8.6% of the 2024 crop but that only 18,131 tonnes were processed in 2023, 3% of that year’s crop. CCF estimates that 20,421 tonnes were processed in 2023. There is a wider gap in the processing capacity estimate. CCF estimates capacity at 82,795 tonnes, a difference of 14% which is related to differences in processors own estimates. Most of the capacity, 49%, is concentrated in large and “export” scale factories. Most of the actual processing in 2023 was in medium scale factories that processed 65% of the total nuts processed. This will change as the larger factories develop toward their capacity.

The estimate of 18,131 tonnes would imply kernels supply of 4,170 tonnes of which 539 tonnes was exported. By implication that means that domestic consumption and end of year inventory were in total 3,631 tonnes. The figure for the domestic market may be high in our estimation. There is interview evidence of export to Vietnam of unpeeled or “borma” kernels which may

have taken place outside the formal channels which may explain the overestimate of the domestic market

The analysis in Figure 5.23 is based on interview data, sector research from a range of studies and the promotional material of the individual units. The overall level of capacity utilisation excluding construction projects is 33%. Cashew factories take 3-5 years to reach capacity. An achievable target is 85% of installed capacity[80]. Based on this, the three larger factories cannot as yet be assessed realistically although the potential is clear. There are concerns however, for the micro, small and medium factories that are, on average, well established but did not attain capacity utilisation levels that could be said to be viable in the long term. This was expressed in the interviews with these groups. The majority, when asked, told us that they were happy with their decision to enter cashew processing. Most said that they are profitable but only two said that they had reached expected profitability levels.

Figure 5-23 – CASHEW PROCESSING PLANTS IN CAMBODIA – Number and Capacity

Type/ Capacity, Number	Number	Total Capacity	%	Capacity Utilised	Capacity Utilised %	% Excl. incomplete.	Typical Years in business
Micro-300 tonnes	19	1,595	2.2 %	341	21%	21%	3-15
Small - >300<1,000	9	8,560	12 %	1,400	16%	16%	3-8
Medium >1,000<5,000	9	25,470	35 %	11,890	47%	49%	3-6
Large >5,000	1	7,000	9.6 %	2,500	36%	36%	<3
Export Scale 10,000+	2	30,000	41 %	2,000	7%	13%	<3
Total	40	72,625	-	18,131	26%	32%	<4

Access to working capital was one of the key areas that processors suggested as a reason for factories not reaching capacity or targeted gross profit margins for processors (25-35%). It is related to scale and ownership with Cambodian owned small and medium factories finding it more difficult to access funding than foreign investors.

FIGURE 5-24 CASHEW FACTORY OWNERSHIP

Cashew Factory Ownership by number of factories.	Micro & Small	Medium	Large and Export
100% Cambodian owned	95%	56%	0%
International Partnerships	5%	11%	0%
100% foreign owned	0%	33%	100%

The ownership pattern in Cambodia follows similar patterns in African countries where processing is also a new activity. The larger factories are foreign owned as a result of the level

[80] Fitzpatrick. J, Global Cashew Processing Equipment Study, Com Cashew GIZ. 2010 and Update 2019.

of investment required to build a large factory (US$ 4-7 m) and, more importantly the working capital needed to fund an origin-based processing unit e.g. a 10,000-tonne unit would need US$ 10.6 m of working capital to operate at 85% capacity.

Ownership, level of investment and working capital requirements are the main determinant of scale in cashew processing. The development of semi-mechanised processing over the past twenty years has meant that the viable scale for a bulk processing cashew unit has increased. The semi-mechanised factories that are now the standard for new processing require higher capital investment and must be larger in scale to offer attractive returns on investment[81]. To compete in the mainstream, large volume market factories should be of a minimum scale of 5,000 tonnes capacity and ideally at a larger scale of 15,000 tonnes as new developments in Cambodia appear to be. The cost of processing per tonne of raw material should be competitive with the dominant market supplier, Vietnam, at levels at or below US$ 200 per tonne of RCN plus any difference in supply chain costs.

Not all factories must be of large scale to be profitable. Small and medium scale factories can compete through strategies such as additional value addition such as secondary processing e.g. roasting or flavouring or packing in consumer packs for direct sale to distributors or retailers. There are other ways to achieve viability at a lower scale such as working in premium or certified supply chains e.g. organic or fairtrade cashews. There is also good evidence in Cambodia that smaller factories can contribute to the development of the sector with expertise and the experience necessary for successful processing. There are examples of this such as the cooperation between Mirarth Agro Tech and Chey Sambor. The small and medium factories may be a key resource in the development of the required knowledge and skills more widely.

In Chapter 3 the comparative performance of the major processing countries was considered and briefly assessed. Using a series of factors originally identified in “The Cashew Processing Equipment Study” of GIZ Com Cashew (referenced above) we assessed the information on the current status of the Cambodian cashew processing sector based on the interview feedback and data from the literature including studies previously commissioned for the Cambodian cashew sector such as “Benchmarking the Cambodian Cashew Sector” GIZ CRAS 2023 and cashew processing coaching work with the Harvest II Project. Figure 5.25 summarises the assessment. It focusses primarily on qualitative factors as clearly Cambodia has enough raw material to support a processing industry.

FIGURE 5.25 CAMBODIAN CASHEW PROCESSORS SITUATION (CRITICAL ISSUES HIGHLIGHTED IN RED)

Factor	Cambodian Situation	Status
Available quality, dried raw material	The current supply chain organisation is geared toward trade in undried raw material impacting quality and availability. There is little use of jute bags except by processors. The large size of the nuts is both an opportunity and a challenge as on one hand large nuts are more valuable but on the other the market is adjusted to a standard WW320 size.	Critical problem that needs to be addressed.

[81] West Africa Pro Cashew Project, Value Addition Policy and Support Development, USAID, 2022.

Factor	Cambodian Situation	Status
Supply chain linkages/efficiency	There is a low level of opportunity to build the needed linkages to farmers due to the current supply chain organisation and particular the lack of farmer organisation. This aspect is critical if processors are to compete with Vietnamese competitors in the supply chain and if a traceable, integrated supply chain is to be established.	Farmer organisation is a key need.
Process method	The process method used in most factories is appropriate for the type of raw material and buyer requirements.	In line with best practice.
Process scale	Process scale in the new factories is in line with best practice in the industry. More large-scale processing units will be needed if objectives in market diversification are to be achieved.	In line with industry trends.
Smaller plants markets	Micro and small-scale factories in Cambodia are taking an approach based on higher value addition for domestic or export markets. Some are also working toward premium branding and supply chain certification.	Processors need assistance to secure markets.
Available workers semi-skilled	Based on interview responses the workers in the factories have sufficient skills. Manual peeling and grading rates as reported by interviewees are similar or superior to factories elsewhere. No processor reported a shortage of workers.	Appears in line based on processor feedback.
Available managers	Many smaller factories are managed by the owners or their families. In order to build a cashew sector training and/or employment of ex-patriate managers may be required. There are many qualified people in the region.	Critical challenge going forward.
Access to financial services	Access to financial services for small and medium processors is poor. They reported that financial institutions are interested in the cashew sector but are unwilling to advance funding secured against raw material without property of other hard assets as security.	The sector lacks competitiveness especially for national entrepreneurs.
Use of processing technology	Almost all factories have embraced the processing technology in so far as they can. The decision-making processes reflect well on the factory management particularly in decisions on the scale and which parts of the process to mechanise.	In line with good practice.
Access to parts and service	Processors reported no difficulties either in accessing parts from Vietnam or China directly or through Cambodia distributors.	No issues.

Factor	Cambodian Situation	Status
Food safety	This is a problematic aspect. Factories have HACCP systems in place, but this will not allow access to some of the likely target markets. An upgrade of the processing food safety certification is needed.	Critical for access to high value markets.
Processing to specification	Factories are not processing to standard specifications. This may hinder access to kernels markets in future. In discussions during the consultative workshop awareness of international standards was found to be at low levels.	Not essential but adhering to standards can help access markets.
Product quality	Based on reviews of the product and samples, the product is of good quality.	No issues
Market information	Market information systems are poorly developed.	Critical constraint.
Use of by products	By-products of processing such as shell and testa are managed well by some but inconsistently across the segment. The shell is used as fuel and sold to Vietnamese buyers for prices ranging from US$ 60 - 110 per tonne. Testa is not used by many, but some processors are selling it at low prices US$ 0.05/kg for animal feed.	Progress should be uniform across the sector.
Packaging	Packaging standards conform with buyers' requirements. Packaging materials are mainly imported. As the industry grows there may be an opportunity to establish national packaging manufacture.	Long term goal
Logistics and export costs	Export costs per container based on forwarder quotations range from US$ 1,110 to 1280 per container including the Phytosanitary Certificate. This is significantly higher than the equivalent cost in Vietnam at US$ 550 or Cote d'Ivoire $500. Informal payments and staff waiting time were also highlighted by respondents in consultations.	Streamlining of costs can assist but the cost difference represents only 0.66% on a WW320 cashew kernels value. Streamlining of the process may be more important.
Environmental protection	Cashew processing can be damaging to the environment if the by products are not well managed. We were able to ascertain that there is an awareness both of the risk and the opportunity for sale of by-products. The method of using the shell as boiler fuel needs assessment e.g. Are harmful emissions removed? Is the CNSL extracted before burning?	Good environmental practices should be enforced at cashew factories.

The low level of the crop that can be processed in Cambodia is in line with many cashew producing countries. At a capacity of 72,625 tonnes Cambodia ranks eighth in the World. In

terms of actual processed volume in 2023 Cambodia ranks 10th [82]. Cambodia has made faster progress than many African countries due to the early adoption of technology and the entrepreneurial business culture in the cashew processing sector mainly based on smaller factories until now.

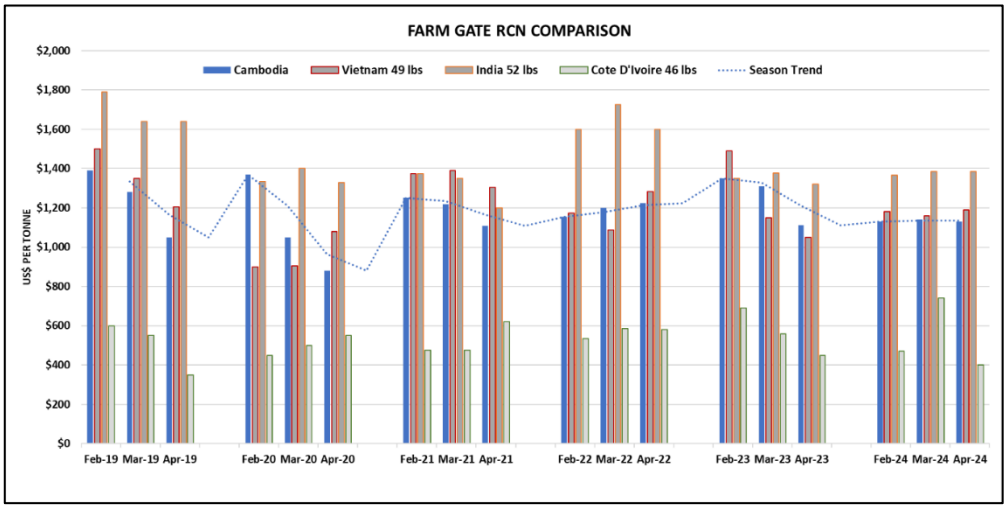
Key points:

- Cambodian processing has made enough progress to give confidence in the long-term future of the sector.
- Processing remains at a relatively low proportion of the crop but current capacity, if turned into actual processed volume, will rank Cambodia in the top ten processing countries even at this early stage.
- There are several challenges related to supply chain development, financial services and marketing that may act as constraints on development of processing.
- For basic guidelines on cashew processing the Com Cashew Guidebook on the Cashew Process is an informative publication.[83]

5.2.4 Marketing and Pricing of RCN

Prices in the RCN chain are dictated by Vietnamese processors and traders. Competition for supply moves prices up or down. There is a low level of market information and no alternative market for the products. Farmers and collectors have no holding power. Trader assemblers have more ability to hold but are not in a position to store cashew nuts for any longer period of time as they do not have the infrastructure even if they had the finance and the inclination to do so. Effectively, the post-harvest infrastructure for the Cambodian cashew crop is located in Vietnam.

FIGURE 5.26 FARM GATE/COLLECTOR PRICE COMPARISON SOURCES: WWW.THECASHEWCLUB.COM, CASHEW WEEK,



Note: Cambodian prices are undried. All others are dried 9/10%.

[82] Calculated by author based on ISS database.
[83] Adzanyo, Fitzpatrick, Pal, Kutie Weyori, Guidebook on the Cashew Processing Process, GIZ/Com Cashew 2019 www.comcashew.org/downloads

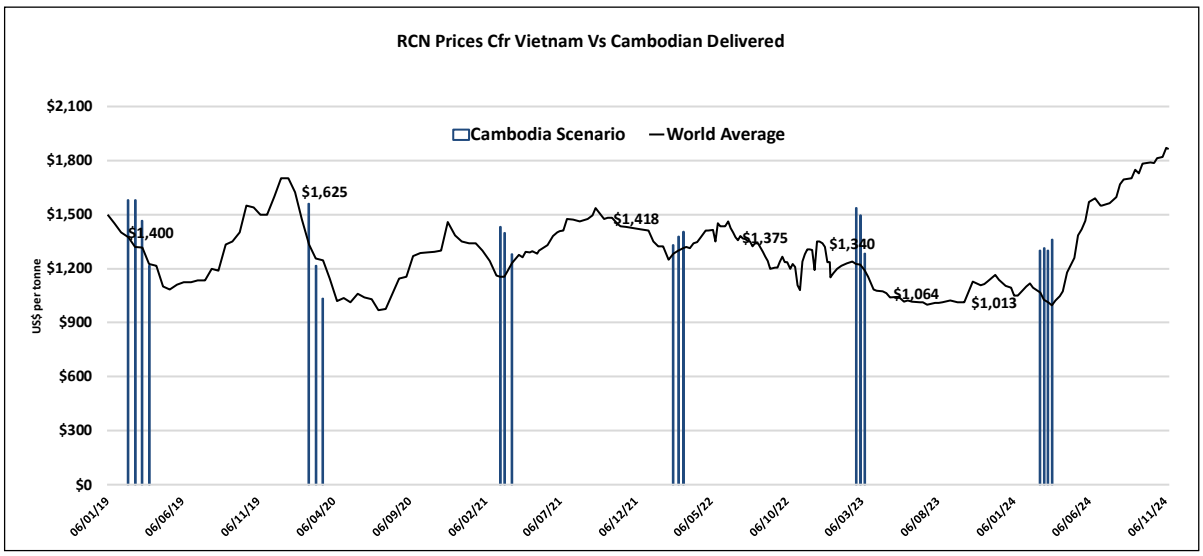
Figure 5.26 shows that Cambodian RCN prices are consistently close to or above (taking into account that the RCN is not dried) Vietnamese farm gate prices. This reflects their quality. They are much higher than African prices reflecting the quality and the distance of African producers from processors in India and Vietnam. It is also noticeable that prices started the season higher than they finished in five of the six years regardless of the international market trend which is reflected in the prices paid in Cote d'Ivoire and which tend to follow the market. This is most likely due to the harvest pressure created by the weak holding power of farmers and traders and the lack of post-harvest drying and storing. This was confirmed in trader's comments regarding whether or not they hold RCN for later sale as mentioned above. After the season prices tend to move upwards reflecting supply and demand in the international market.

Comparing Cambodian RCN prices to Vietnamese prices, Cambodian RCN traded at a discount of 0.37% to Vietnamese RCN based on season averages over the six years. This varied from -12.09% in 2019 to +16.63% in 2020. If we calculate the moisture content difference to be 7% or US$ 83 per tonne[84] and the quality premium for large, higher yielding Cambodian RCN to be in the region of US$ 250 per tonne (compared to similar large Indonesian or Senegalese nuts) or 21% then it appears that Cambodian farmers do not achieve prices that reflect the quality they produce. This may be due to the infrastructure and market factors mentioned already but it is also due to the fact that there is not a large enough market for premium cashew nuts.

Figure 5.27 compares Cambodian RCN to the international prices of RCN on Cfr basis. The Cambodian prices are compared by adding 7% for drying loss, US$ 60 for trader's margins in Cambodia[85] and US$ 30 for delivery costs to the border[86] . This calculated using estimates from traders (trucking $375-500, customs $175, weighting $12.5, loading $5 per ton, clearance $25). The "World Average" is the average price for RCN available for Vietnamese processors to buy in the open market. The average quality equates to an outturn of 48 lbs and a nut size of 190-210 per kg during the Feb-May period each year. Cambodian prices would be expected to be significantly higher than the average due to the quality of the RCN. This was not the case from 2019- 2022 but in the past two seasons Cambodian RCN has made significant premium prices to African competitors reflecting its quality for the first time. However, in both of those years' prices fell during the season in Cambodia and rose after the end of the season. This suggests that although Cambodian quality is being recognised it may be more due to its early availability compared to African RCN. Therefore, Cambodian farmers are likely to experience more volatility in prices in the future.

[84] Based on the six-year averages.
[85] Discussed above.
[86] Costing from interviews.

FIGURE 5.27 PRICE COMPARISON IN THE INTERNATIONAL MARKET



5.2.5 Marketing and Price of Cashew Kernels – Domestic, Export, Bulk

The price of cashew kernels is determined by the cost of raw material, its quality and the cost of processing it. In research we found a range of estimates for the cost of processing ranging from US$ 200 – 300 per tonne of raw material in interviews with medium processors to US$ 508 in a Feed the Future Harvest III study[87] to US$ 625 estimated for smaller enterprises in the GIZ CRAS study, Benchmarking the Cambodian Cashew Sector.

Figure 5.28 takes each of the costs at a set price of raw material to illustrate the cost of cashew kernels production. The scenario is based on a processor buying wet nuts from a local cooperative in March and drying them at their own factory. It uses the typical outturn, farm gate price and applies the three processing costs above. Finance and marketing costs are not included.

FIGURE 5.28 2024 COST OF PROCESSING AND CASHEW KERNELS

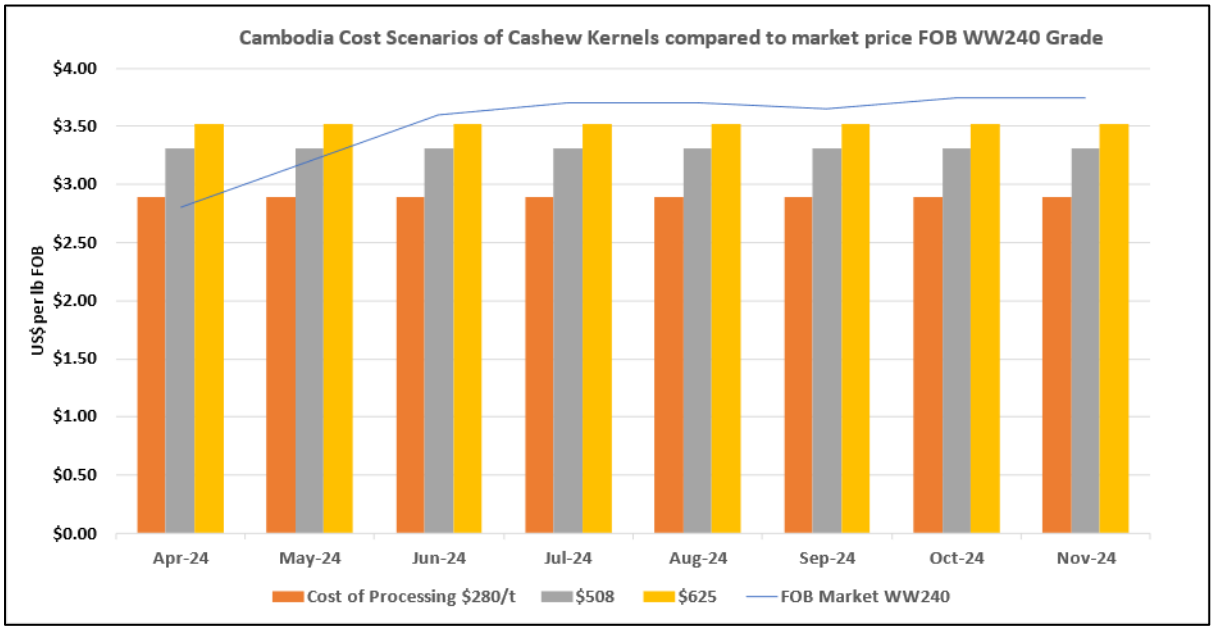
Cost of RCN Ex Farm	$1,140	Moisture at intake	16%
Delivery cost per tonne	$15	Outturn	29%
Drying & bagging cost per tonne	$53	Process losses	4%
Dried cost per tonne	$1,292		
Outturn kgs	290		
Process losses kgs	40		
Net outturn kernels kgs	250		

[87] Kep.T., Report on Cashew Nut Cost Analysis, Feed the Future Harvest III , CCF, July 2024.

Cost of processing per tonne RCN	$280	$508	$625
Cost of product per tonne kernels	$6,288	$7,200	$7,668
Average cost per lb kernels	$2.85	$3.27	$3.48
Export costs per lb	$0.04	$0.04	$0.04
Average cost of kernels FOB	$2.89	$3.31	$3.52

Comparing the average cost of kernel FOB Cambodia for export with the market for cashew kernels from Vietnam Figure 5.29 shows the cost on average compared to the market price for WW240 kernels. WW240 are used as Cambodian cashews are larger sized. In most international analyses WW320 would be used as the benchmark grade.

FIGURE 5.29 COST COMPARED TO MARKET CAMBODIA PROCESSED CASHEW KERNELS 2024



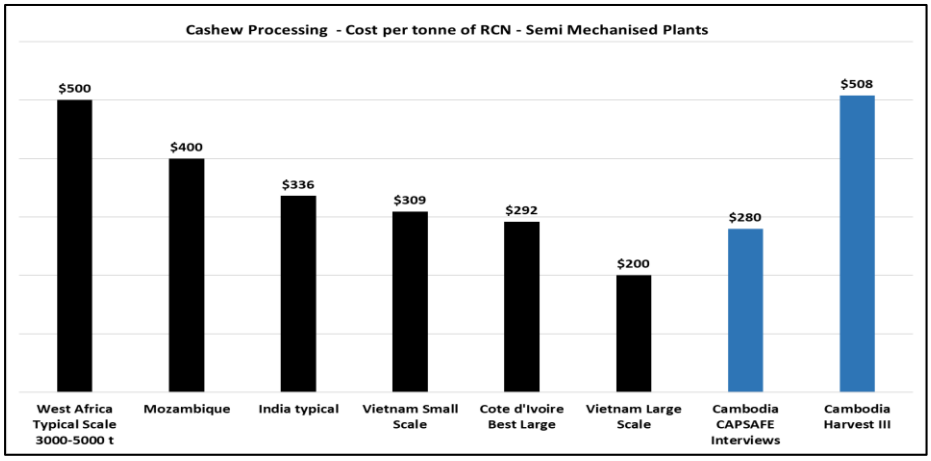
Cost of processing	Average Gross Margin Apr-Nov 2024	Comment
US$ 280 per tonne RCN	22%	Profitable but below targets.
US$ 508 per tonne RCN	6%	Not profitable
US$ 625 per tonne RCN	0%	Not profitable.

Conclusions

1. Processors face strong competition from Vietnamese processors impacting raw material cost.
2. Cost of drying by processors impacts costs and margins.
3. To be competitive in the open market processors must bring costs to similar levels as Vietnam but not necessarily to Vietnams low levels as product quality is superior.

4. Small and micro scale processors cannot compete in the commodity market and must seek premium markets e.g. consumer packed or certified supply chains.

FIGURE 5.30 COMPARISON COST OF PROCESSING PER TONNE RCN



Vietnamese processors have low cost of processing but high cost of raw material supply – circa 55% of the raw material comes from Africa. The high cost of movement is a buffer for Africa processors. Cambodian processors do not have this buffer.

5.2.6 By Products Usage and Commercialisation

By products usage in Cambodia is low although large processors reported plans to develop CNSL extraction units. Processing 20,000 tonnes of RCN will generate 15,092 tonnes of shell and 308 tonnes of testa. The shell will include about 3000 tonnes of valuable Cashew Nutshell liquid that has applications ranging from natural polymers to biofuel with values ranging from US$ 250 per tonne to US$ 950 per tonne if refined. The use of shell after extraction of the CNSL as boiler fuel in cashew factories is almost universal. Using the shell without extracting the CNSL or without the installation of an emissions treatment system e.g. a scrubber can cause environmental hazards.

In Cambodia the shell, usually without the removal of CNSL, is used as boiler fuels and the bulk is sold to traders at prices ranging from US$ 50 -110 per tonne to local traders. This is most likely sold on to Vietnam to be consolidated with the large quantities there. The testa is sold is either thrown away or mixed with the shell for sale together. If Cambodia were to process half of its crop it would need to find applications for 315,000 tonnes of cashew shell that is high in calorific value. The installation of by product processing units is essential both to take advantage of the value of the shell and to protect the environment from the harmful cashew nutshell liquid.

By-products were noted as a cause of much interest but also much confusion during the consultation workshops. In assessing the value of by-product processing it is important to keep a perspective on the relative value of the products and by-products of cashew processing

In research we noted much discussion and interest in CNSL as a by-product for energy generation. This appears to be primarily based on the idea that cashew shells currently are wasted. This is largely a correct observation for Cambodia and West Africa. However, in India and Vietnam CNSL is used in higher value applications in the automotive and natural chemicals sectors.

The by-products from the processing of cashew nuts play a minor part in the overall profitability of the enterprise. It is an important feature of processing that all parts of the shell and inner skin (testa) are used in the process or marketed. The sale of by products will initially account for less than 5% of sales revenue based on conservative values for the by-products (US$ 250 per tonne for CNSL and US$ 80 per tonne for shell cake i.e. the shell residue after CNSL removal). The management and sale of by products is an important part of the business development. In cases whereby products have not been marketed processors have eventually paid to dispose of the waste material. Examples in Ivory Coast of cashew shells piled up around the perimeter of the factory and of processor paying up to US$ 70 per tonne for removal of the shell are common.

FIGURE 5.31 BY-PRODUCTS RECOVERY VOLUME AND VALUE 1 TONNE PROCESSED RCN

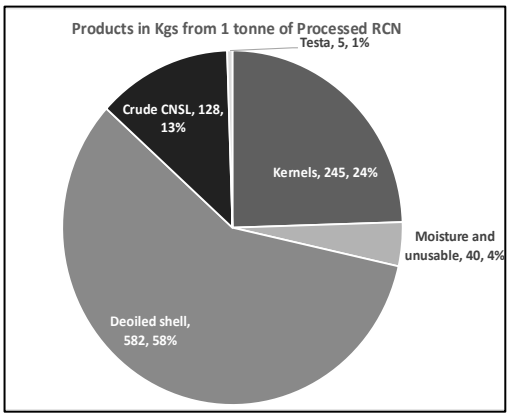
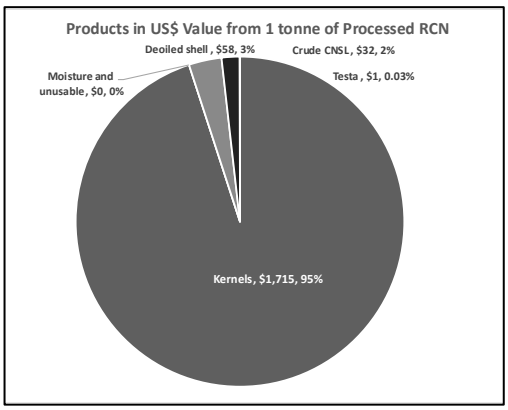


Figure 5.31 shows the volume in kgs and value in US$ generated by the processing of 1 tonne of RCN.

Most of the volume is shell with a content of CNSL in the range of 20%. It can be harmful to the environment and hazardous for people. It must be managed to avoid environmental damage.



The vast majority of the value generated by the processing of cashew nuts is in the form of cashew kernels. By-products present an opportunity to generate additional value. The example is based on the extraction through pressing of crude CNSL. Further processing of CNSL can increase the value of this product.

The values taken are based on the cashew kernels market in November 2024 and the reports of processors on their sales of by-products.

Note: Cashew Nutshell Liquid (CNSL) is the pericarp fluid of the nut, a viscous liquid contained in the honeycomb inner shell of the raw cashew between the shell and the kernel. It is the substance which makes cashew shelling by traditional hand methods difficult as it causes blisters on workers hands. Gloves are sometimes worn for protection in the shelling process, but more often than not, the nuts and hands are coated in cashew kernel oil, castor oil or some other absorbent material for protection. Gloves are often less preferred by workers as they may be uncomfortable or slow down the work. It is a key safety issue in cashew factories.

CNSL has an economic value and can provide many phenolic compounds with far greater versatility than petrochemical based phenols. It appears that the outlook for the marketing of CNSL is positive. It has an expanding range of applications due to being a natural phenol (as opposed to a carbon based Petro-chemical) and likely price advantages although in the

manufactured phenols segment the value is linked to petroleum prices. The CNSL market is not a commodity type market as such and lacks standardization or any open market trade.[88]

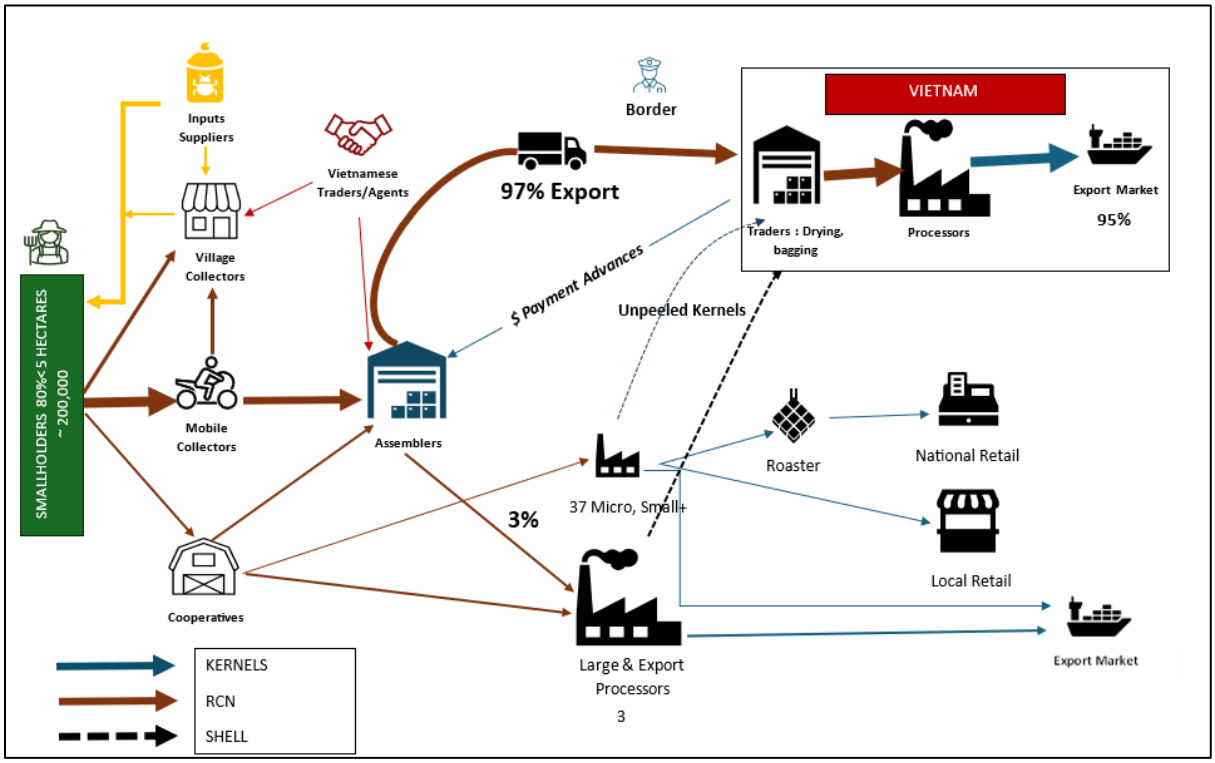
Key points:

- Cambodian cashew processors can be competitive for bulk cashew kernels but have less of a cost margin compared to African processors competing with Vietnam. Scale, efficiency and strong management are required to compete.
- The exploitation of by-products is an essential element in the management of environmental risk, and maximising sales revenue but are not themselves a commercially viable process unless the sector is at a very large scale.

5.3 Sector Organisation and Cohesion

5.3.1 Value Chain Diagram

FIGURE 5.32 CAMBODIA VALUE CHAIN DIAGRAM



5.3.2 Types and Numbers of Actors and Their Roles

Actor	Role
Farmers	Estimates as to the number of farmers vary widely. Based on the hectares planted and the average farm size we estimate that there may be 200,000 plus farm families involved on farms of which 80% are less than 5 hectares. Farmers use the money

[88] Various publication cited above Com Cashew Processing Guidebooks, "The Global Cashew Processing Equipment Study" both discuss CNS.

	generated by cashews to support their livelihood. Many are only farming cashews and buy their food. Estimates suggest that about 40% of the farmers are female and 60% male although there is little conclusive data.
Commercial farmers	There are few commercial farmers in the cashew sector. They are usually large family farms, rarely monoculture and operate on units of 10-50 hectares with a few exceptions of larger farms.
Agricultural Cooperatives	There are agricultural cooperatives active in cashews. Our research found that this is most likely in Kampong Thom or Kampong Cham. In Kampong Thom research indicates that ACs are functional but reports from elsewhere are that they are not capable of activity in the marketing of cashews or the supply of inputs such as fertiliser or training. In the other provinces the levels of organisation in the cashew sector were estimated at only 5-10% as cooperatives for other products have not yet organised around cashews. The number of cashew cooperatives is difficult to estimate. In Kampong Thom for example there are 12 but in other provinces mixed product cooperatives make it unclear as to how many are working effectively in cashews.
Input Providers	The cashew sector uses a wide range of inputs. Training and expertise in their use is provided mainly by the distributors themselves although government organisations do provide some education. Cambodian businesses are usually distributors importing from or representing Vietnamese or Thai brands. The seedlings segment has worked well to revolutionise the cashew sector in Cambodia.
NGOs and Extension services	Extension officers and local or national programmes are under resourced. There have been several province wide support programmes for farmers to build capacity in the production of cashews but given the success of production it is doubtful if these are needed to boost extension any further. However, improved agricultural practice especially in the use of inputs may be key to securing future market access and managing the impact of climate change may be key to protecting farmers income.
Trader Collectors	These are small businesses often just using a motorcycle to collect small quantities from farmers in their locality and selling on to village collectors or assemblers. The margins for these traders are small but they provide a vital service in the chain. A second type of collector is not mobile but based in a shop or small warehouse in a village as part of another business. They also buy small quantities and tend to sell them on every day or act as an agent for an assembler.
Assembler Collectors	The assembler is the essential interface between the export trade in RCN and the producers. These are trading businesses that trade in a range of products seasonally. They are private businesses usually with some form of self-funding combined with advances from buyers in Vietnam. They may operate as independent traders or as agents for Vietnamese buyers. There

	are hundreds of businesses like these. Some are large up to 30,000 tonnes handled and others handle a few thousand tonnes. Their role is not only to handle the products but to manage the flow of funds.
Micro & Small Processors	There are nineteen micro and nine small processors. They are small businesses, Cambodian owned and primarily focus on the production of roasted and flavoured cashews in consumer packs.
Medium, Large and "Export" Processors	There are 13 medium and large processors. They are mainly in business less than three years or have ungraded to medium from small in the past three years. The larger units are usually foreign owned and using working capital sourced abroad.
Roasters and Food Processors	There are several businesses in Cambodia that offer cashew-based products and source cashew kernels from processors. These range from micro businesses like Aidan's Cashew Butter to larger snack food packers.

5.3.3 Government Policy and Regulation

The National Cashew Policy 2022-2027 was approved by the Council of Ministers on 13th January 2023. As part of the fourth phase of the Rectangular Strategy it focusses on "productivity and competitiveness through economic diversification". The policy documents were developed in 2020, and it is based on the situation of the sector as it was then. However, the policy goals remain valid with the now much increased production.

The key objectives are:

1. To improve production and product outputs with competitive quality.
2. To promote industrialisation to increase the value-added post-harvest by 25% by 2027 and by at least 50% by 2032. Based on the 2024 crop that would mean adding 140,000 tonnes of processing capacity by 2027 and operating the existing processing to capacity. Then by 2032 that capacity would have to be doubled.
3. To promote exports through market diversification, trade, cost reductions and competitive marketing.

The goals are what is required to make the sector sustainable and successful. However, the target to achieve the goals by 2027 does not take into account the time needed to establish a cashew processing plant and to bring it to full production. Unfortunately, although the goals are well chosen and achievable in our view, they are unlikely to be achieved within the timeframe mentioned. That does not mean that they should not be pursued. Cambodia's policy goals are far more realistic than in many of the other new cashew processing countries where 100% processing objectives, export bans and other ineffective regulatory measures are causing a loss of morale and investor confidence.

The production strategy is focussed on productivity – producing "better" rather than simply "more". This involves the modernisation of production practices, management of pests and varieties with a focus on post-harvest methods. The policies, if successful, should result in lower costs of production. There is a focus on improved varieties, improved yields and the implementation of existing regulations to control and manage environmental risk created by the use of chemical inputs.

The processing strategy focusses on investment in value addition at both the primary level (processing) and secondary level (snacks, ingredients and consumer packed goods). The key problem, as we see it, of post-harvest handling particularly drying is specifically mentioned.

The policy is realistic in its market goals. There is an acceptance that export of raw material to Vietnam will continue to be important and that market offers an essential outlet for Cambodian producers. It infers that by better postharvest handling the Vietnamese market will offer a better return. Kernels markets are mentioned as domestic, regional and global suggesting that the focus is to be on both bulk and consumer packed products.

In terms of investment the policy focuses on the development of human resources, infrastructure including storage and transportation infrastructure and cashew by products (referred to as "waste" in the document).

Key sector supports that are identified are the strengthening of cashew organisations (the CCF is mentioned), development of a centre of excellence and strengthening of research institutions to improve varieties and to assess the performance of the currently popular varieties.

There are a series of implementation measures for each segment. In the production the standout issues are a statistical study of the sector, the control of inputs and encouraging banks to lend to the cashew sector. There has been progress on the first of these with the mapping exercise but there appears to be very little progress on the other two.

In support of processing the standout implementation measures were to encourage farmers to improve post-harvest handling, to improve infrastructure for post-harvest including warehouses and drying yards, to offer technical support to cashew processors and to offer additional incentives including tax incentives to cashew investors. In this analysis of the sector, we have not found progress in any of these areas except the development of new processing plants for which planning must have preceded the policy initiatives.

During the EU-German CAPSAFE Consultative Workshop with stakeholders in December 2024 the subject of the introduction of an export tax on RCN was discussed. As discussed in Chapter 3 Cambodia is one of only a handful of countries that do not levy a tax or duty on export of RCN. The only other major producer that does not have such a tax is Nigeria. The introduction of an export tax has impacted the farm gate prices negatively in some countries e.g. Tanzania[89]. Introduction at a high level could impact prices in the same way but a low or moderate tax is unlikely to do so given the market structure and demand for Cambodian RCN early in the season. Enforcement would be important as the chances that cashew exports would revert to the informal sector are high. Ideally the tax revenue could be ring fenced for use in sector development. This has proven difficult to achieve in other countries as revenue gathered by the customs authorities becomes part of the national exchequer. An alternative that has worked well in the US almonds sector for example is a levy on exporters, collected by the responsible ministry and used for sector development.

Overall, the situation now appears to be that whilst the Cambodian cashew policy is more relevant and realistic than cashew policy in many competing countries, implementation is slow

[89] Fitzpatrick. J, Advocating for effective regulation of the Cashew Nut Industry in Tanzania, Best AC, 2013. https://www.best-dialogue.org/wp-content/uploads/ANSAF-Cashew-report-summary-130722.pdf

and there are questions regarding the technical capacity of the responsible bodies to implement these strategies.

5.3.4 Finance and Financial Services

The cashew economy in Cambodia functions largely without the credit facilities and financial services that might be expected. The primary flow of funding is from Vietnam in the form of advance payments that are transferred for distribution to assemblers and on to collectors or even more frequently by cash payments.

The traders that manage the flow of RCN from the local trade to the border crossing points are funded by their own funds, the cash advances mentioned and private funding. This system does not appear to have changed in the past 15 years. It has just become larger and more complex. In the discussion of infrastructure above we stated that the Cambodian post-harvest infrastructure is mainly in Vietnam. The same can be said of the financial infrastructure that supports the RCN production.

If, for some unforeseen reason, the flow of funds from Vietnam was to stop, it is likely that cashew prices at harvest time in Cambodia would collapse and undried and poorly stored product would go to waste. That would result in cashew trees being removed and long-term damage being done to the sector as well as the carbon footprint of widespread tree felling. Fortunately, this is unlikely to happen in the foreseeable future as demand is strong and Vietnamese processing volumes have been rising. It does however remain a risk for the future of the sector and particularly for those farmers that only grow cashew nuts.

Traders, when asked about finance during the fieldwork, said that there is little need to approach financial institutions as the cost of money and the security required (they say it must be property or land rather than just the RCN itself as elsewhere) would not be feasible. This is in contrast to the situation in many countries where financial services providers are prepared to fund operations in RCN export as there is a fast turnaround and low risk. It may be that in Cambodia the turnaround is too fast for financial institutions to make a realistic margin. In Africa countries for example a typical transaction would be 60 days. In Cambodian the nuts can be sold on and delivered within a few days.

The secondary flow of funding is from abroad and is increasing. The large and export scale cashew processing units are mainly owned by foreign investors which means that there are sources of competitive working capital available abroad. These units are funded by corporate and external financial services. In contrast, the Cambodian owned medium, small and micro units, mentioned during interviews that the barrier to expansion of capacity in their units was the lack of availability of working capital. Some of the interviews and other research showed that some of these units do not keep accounts as they are small businesses and may not have the capacity to produce business plans as part of the negotiation of credit.

If the goals of the industrialisation of the sector, diversification of markets and increase of value addition are to be achieved the sector must be integrated into the mainstream financial system with access to adequate and appropriate financial services.

5.3.5 Organisation of Farmers

Farmers organisation in the cashew sector is lacking. In interviews with growers and cooperatives, we asked," Are farmers organised into ACs or cooperatives?" Their responses varied according to province from 70% as cooperative members to a low of 5%.

Responses to the question Are farmers organised?	
Kampong Thom	12 ACs. 78% membership and ACs are able to do business
Kampong Cham	70% members
Kratie	5-10%
Stung Treng	5-10%
Ratanakiri	39 ACs but mainly mixed. Cashew ACs are being established.
Preah Vihear	5%
Siem Reap	80%

The variation in the level of organisation and the low level in some provinces is likely to be an impediment to the delivery of training and other capacity building measures including building processors supply chains to develop traceability and better post-harvest handling.

5.3.6 Organisation of Commercial Actors

The organisation of commercial actors is at an early stage in Cambodia. The key commercial actors are processors and traders. Inputs providers, processing equipment suppliers and logistics providers are also part of the cashew sector and potentially supporters of cashew organisations. Some are members of the Cambodia Cashew Federation.

A review of the organisation of actors yielded the following observations:

1. Collector traders – there is no local or national organisation dedicated to supporting these actors. In other countries examples of organisation of local traders may be found e.g. Cote d'Ivoire and Ghana. Organisation at this level can be supportive of change in quality and post-harvest handling as demonstrated in Cote d'Ivoire where an organisation of 1300 local traders and agents has been key in messaging on quality farmers and traders[90].

2. Assembler traders – No trader informed interviewers that they are a member of a trade organisation. This group is often found to be less interested in organisation as their interests are diversified across many different commodities and the nature of the trade often leads to a less open business culture.

3. Processors – There is no specific processors representative organisation as often found in cashew producing countries. Both the CAC and CCF have the development of processing and support for processing in their objectives. Processors are members of both organisations. The objectives of the two trade organisations refer to increasing the number of processors.

[90] Discussions with Ivorian processors for this study.

4. Cashew workers – There are no organisations dedicated to representing workers in cashew factories.[91] The ILO report that labour and occupational health and safety violations are common in cashew processing.
We could not find any evidence of organisation of cashew farm labour.

CAC includes in its objectives supporting processors with food safety, packaging, finance and marketing but there are no programmes evident or mentioned by processors. CAC has been more active in supporting farmers. CCF appears to have objectives that are related to the securing support for processing development which is a key element of the National Cashew Policy in which CCF is mentioned as the apex organisation for the sector.

Neither organisation appears equipped nor resourced to support processors in a technical capacity. They are better placed to support investors by way of introductions and clearing a pathway through the bureaucracy and regulations. However, as it stands there is no truly representative organisation for processors at this time.

Both CAC and CCF have made progress. Both are nationally and internationally known. From an outsider's perspective comments from international actors in discussions for this report were revealing. They expressed confusion as to the role of each organisation. One or two, in personal conversations, referred to competition between the organisations and potentially animosity. These comments echoed some of the delegates comments during the World Cashew Conference at Siem Reap in February 2024.

5.3.7 Women in the Value Chain

As discussed above, women play an important role in the production of cashews. Cashew farmers, according to reports from interviews for this analysis, are 30-40% female although some questions were raised with regard to the beneficial ownership as opposed to the registered owner of farms. This level of participation exceeds that found in most cashew countries. It does not however reflect the composition of the population by gender. Despite high levels of participation compared to other countries, Cambodian women are underrepresented in the production segment.

We did not survey collector traders for this analysis due to constraints on resources, mainly time, but findings by the ILO (referenced above) found that 16 of 23 collectors interviewed were women who had in the opinion of participants the "same negotiating power as men and can start their own enterprises".

In the 21 cashew processing units interviewed for this analysis we asked about the gender of workers and the gender of supervisors/managers. The findings should be treated as guidelines as the research covered only 50% of the factories in the country but there was a good spread by type and location. The results look similar to the pattern found in other countries.

[91] Vathana et al, Diagnostic of Informality in the Cambodian cashew nut industry, ILO-EU Advancing Social Protection in Cambodia, 2024.

FIGURE 5.33 WOMEN IN CASHEW PROCESSING PLANTS

Factory size/Participation	Production Workers	Range	Supervisors/ Managers	Range
Micro, Small, Medium units	71% Average	66-90%	37%	0-50%
Large, Export units	80% Average	66-90%	7%	0-20%

The workers in cashew factories are mainly women. This is similar to cashew factories elsewhere. Managers in cashew factories maintain that women are more dextrous and apply themselves better to the type of concentration and diligence needed. Traditionally in manual cashew factories worldwide the work was on a piecework basis and carried out by women as they were able to earn more than men due to their productivity. There are no modern studies done on this partly because there are few examples where comparative performance can be measured. Some studies, including the ILO study mentioned above, point out that in rural areas men may work on the farms whilst women go to work in the factories.

The mechanisation of the cashew processing sector has reduced the number of workers per factory by a factor of up to ten depending on the process. In mechanised factories the manual work is now more about peeling of reworked kernels and grading. This is changing the gender balance in factories as workers become more "machine minders" than skilled manual workers.

Managers and supervisors in cashews factories are far more likely to be women in the small and micro units. These are often family-owned businesses. In larger, mechanised factories the number of women that are supervisors or managers was far less than in the smaller units. This does not reflect experience in new African factories where whilst managers remain mainly male, supervisors are predominantly female. However, these factories are new so a review when they are operational at a greater capacity would be informative.

Key points:

- Cashew production and collecting includes significant female representation
- Cashew factory floor workers are mainly female.
- Cashew managers are mainly men and less likely to be women in larger factories than in small and medium scale units.

5.3.8 Labour and Working Conditions

Working conditions in cashew factories were poor during the manual processing era. Based on observations from visits to cashew processing units in 14 cashew producing countries in recent years, this has changed in many countries as mechanisation has been introduced and also under the influence of buyers demands for food safety i.e. less manual handling, uniformed staff and policies that have beneficially influenced workers conditions. Trends in legislative requirements in destination markets especially the EU are requiring factory operators to show that they respect workers human rights. This may prove to be a more effective enforcement mechanism than local enforcement bodies in the future.

Risk remains in cashew processing for workers. In addition to the usual health and safety hazards of moving large volumes and operating machines, the two key areas are in shelling where the cashew nutshell liquid is harmful to skin and in manual peeling where sharp knives are used. In large factories these risks are mitigated by almost universal use of shelling

machines and the use of peeling machines that reduce the volume to be peeled. Proper training of workers is a key aspect of risk mitigation in these areas.

In Cambodia, shelling machines are used in the large factories and small adapted shelling machines are now common in smaller factories. This has improved workers conditions. Peeling in small factories remains mainly manual according to interviews with processors. Small scale peeling machines are less available and less efficient so it appears that micro and small units will persist with manual peeling. All the processors interviewed reported that their staff were trained either by managers or by other processors. Some senior staff had spent time in Vietnam learning about cashew processing as part of the procurement package of the processing equipment.

The commercial interests of processors are well served by better trained workers as the loss in value through product breakage is high. We asked processors about the productivity of their workers. Manual peeling rates per worker per shift varied from 7-10 kgs which is in line with industry norms[92] . One factory reported an exceptional 15 kg per shift. Grading was reported by processors at 30-50 kgs per worker per shift which is below reports from the best factories in Africa, India and Vietnam.[93]

We also asked processors how far their workers travelled to work. They all answered less than 10 kms and most were less than 5 kms. This indicates not only the availability of workers but a positive view of the factories in terms of working conditions.

The levels of productivity, training, the lack of any problems recruiting workers and the perception according to the ILO that cashew processing jobs are “good” jobs according to workers with pay of US$ 190 per month seem to suggest that working conditions are at international norms in Cambodian cashew processing plants but not necessarily in compliance with best practice and upcoming legislative requirements.

The quality of the jobs created as the industry expands is a key concern. In other countries there have been concerns with regard to employment contracts, timely payment of wages, payment of overtime, management and authority culture, benefits promised but not delivered, uniform supply/care and training[94]. The cashew sector in Cambodia, on the available evidence, appears to have set off in the right direction. It is important that it stays on track not only to protect workers rights but also to allow access to high potential markets such as the EU.

5.3.9 Cohesion and Trust in the Chain

Sector cohesion on a shared sector identity or vision, engagement with stakeholders in the development of policy and transparency in the chain[95]. This has proved to be a difficult proposition in the cashew sector globally as there is a lack of transparency and poor market information systems throughout. This has led to low levels of trust, poor organisation and contributed to market volatility.

[92] Fitzpatrick. J, Competitiveness of the African Cashew Sector, Gates Foundation 2019.
[93] Adzanyo , Pal, Fitzpatrick, Guide to Cashew Processing, GIZ ComCashew 2018.
[94] CNV Intl Looking for synergies: Understanding labour in the cashew sector in Cote D’Ivoire, FairMatch 2024.
[95] Fitzpatrick. J, Cashew Policy Series 2022: Building on a solid base of stakeholder trust and engagement, West Africa Pro Cashew Project 2022

All interviewees were asked about trust. The questions focussed on individual opinions of their trading partners rather than broad questions as to sector cohesion. The findings were mixed but broadly reported that there are low levels of trust and a lack of information on the sector leading to low levels of sector identity potentially leading to a less cohesive value chain.

Producers and ACs in six of the seven provinces said that they do not trust collectors who they said were always trying to lower prices by claiming that the quality of the product offered was lower than it actually was. This problem is accentuated by the fact that product is not dried, rarely tested and often sold in small quantities at the farm gate. The exception is Kampong Thom where the reports were more positive in this aspect referring to the fact that collectors are usually local and often neighbours.

The collectors got a more positive review from the trader assemblers who mainly described them as either “trustworthy” or more often as “closely controlled” suggesting a businesslike relationship governed by agreed rules. One exception was Ratanakiri where traders reported addition of stones or sand to increase weight. This is a common complaint in the cashew sector that often results from poor collection rather than fraud.

Processors in general want to work with farmers. They work through ACs, NGO projects or CAC. These relationships were far more positively viewed than the trader-based supply chain model. Processors need a transparent, traceable supply chain. This can only be achieved by working with farmers or farmer organisation. One frustration is that farmer organisations do not have the capacity to work as facilitators or commercial partners in the development of relationships with farmers. The large and medium processors and some of the small processors reported initiatives in this area.

The trader assemblers do business with Vietnamese traders and, in a few cases, processors. In general, they do not trust their contract counterparties particularly with regard to product quality analysis which affects pricing.

In summary, the lack of sector organisation and transparency either due to the absence of interaction between actor types or the lack of transparent market/sector information contributes to a situation in which trust is low in the sector. This inhibits the development of a shared vision and sector identity which in turn could have consequences for sector cohesion in the medium term especially if conditions of lower market prices or poor demand were to emerge.

6. Status and Potential of the Cambodian Cashew Value Chain

6.1 Economic Impact

6.1.1 Value Added by the Chain

The cashew sector has become an important part of the agriculture sector in Cambodia. In 2024 the direct value added by the cashew sector in Cambodia is estimated at US$ 1.072 billion which calculates at 3.8% of the 2023 GDP total for the country.

FIGURE 6.1 DIRECT VALUE ADDED BY THE CASHEW SECTOR EXCLUDING RETAIL MARGINS 2024

	Tonnes	US$ /tonne	Total	Value added
Production	840,000	1,141	958,440,000	958,440,000
RCN Export Jan. to Oct.	816,000	1,301	1,060,491,000	102,051,000
Processed FOB Value	20,000	6,612	33,060,000	10,240,000
Secondary processing	500	10,000	5,000,000	1,694,000
			Total $	1,072,425,000

Eighty-nine per cent of the added value is added by farmers based on farm gate prices and includes their expenditure on inputs, farm labour and their livelihood. An estimated US$ 1.06 billion is accounted for by the export of RCN to Vietnam which adds US$ 102 million including the margins of the traders, transportation, warehouses and other services. Primary and secondary processing adds a further US$ 12 million. The figures do not include any multiplier impact of wages or services paid for.

6.1.2 Distribution of Value in the Chain

Figure 6.2 is an estimate of the share of the value generated in the chain by type of actor. As a primary commodity chain, the bulk of the value remains with farmers. The high level of value that is located with farmers at a total of 89% is due to the reality that Cambodia adds hardly any value once the product is harvested. There is no post-harvest value addition and a very low level of processing. A high proportion of the total value being paid to farmers would usually be seen as a positive sign but in this case, it is more of a sign of a underdeveloped sector. If Cambodia were to process all of its crop to bulk cashews for export at current market prices in 2024, an additional US$ 400 million or 37% could be added. This would reduce the farmers share of value to 65% which is a more realistic comparison with other sectors.

FIGURE 6.2 ESTIMATED SHARE OF REVENUE CAMBODIA CASHEW SECTOR BY ACTOR

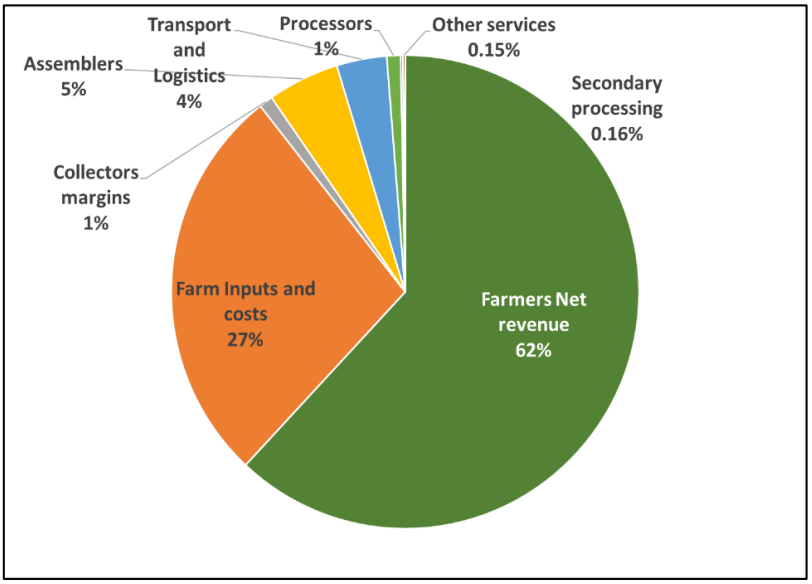


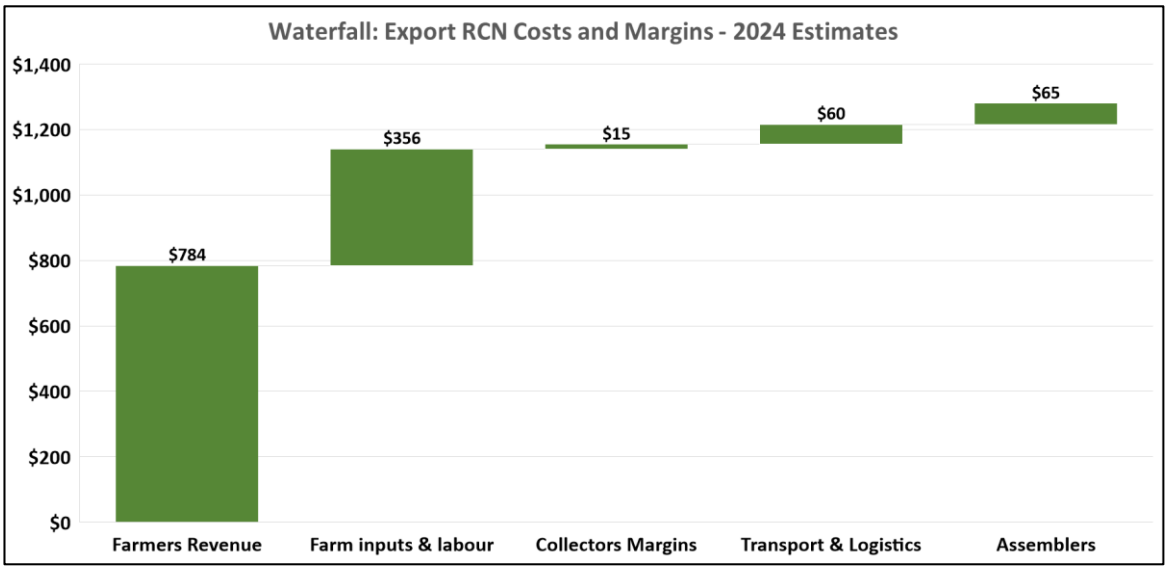
Figure 6.2 is calculated by taking the value of Cambodia exports of RCN and processing of cashews and attributing the value to the actors in the chain according to the value they add.

Farm inputs and costs incudes all inputs including labour, chemicals and services. For other actors such as processors the entire value is considered including cost and margins.

Note: Processing means shelling and grading sometimes known as primary processing. Secondary processing is the roasting, flavouring and packing for consumer packs.

To identify how the value and margins in the sector are distributed it is important to distinguish between the RCN export of undried cashews in shell and the processing for export and domestic consumption. This is done in Figure 6.3 for RCN and 6.4 for cashew kernels. The calculations are estimates for 2024. This is important as the crops of 2022 and 2023 were much lower due to weather conditions and would understate the reality and the potential. The waterfall analysis is based on the actual costs and prices found in the chain in 2024. These have been referred to and the sources referenced in Chapter 5. The basis of the calculation in both cases is the typical practice in the chain for example the sourcing of RCN by collector traders. There are other possibilities such as in the small number of ACs trading in the product on behalf of farmers.

FIGURE 6-3 WATERFALL ANALYSIS EXPORT RCN CHAIN



Assumptions:
1. Farmers sell at March market price.
2. Vietnam average price of imports reflects value of exports.
3. One collector and one assembler in the chain.
4. RCN is exported without drying.
5. Farm inputs based on research described above in Chapter 5.

The RCN chain is relatively direct. The collectors are small margin takers on average and offer a service that would require heavy investment to replace that would not be viable based on the direct export of undried, untreated cashew nuts inshell. Assemblers in general take more risk, need greater infrastructure and require funding for their business. Their margins according to interview and the literature review are typical traders' margins in such chains. It is unlikely that if they were trading in cashews alone their activity would be viable but as a trader of a range of products during multiple harvest seasons, they provide a service at a viable cost. There is little evidence that, on the broad scale, assembler traders are taking excessive margins or that there are too many intermediary traders in the chain.

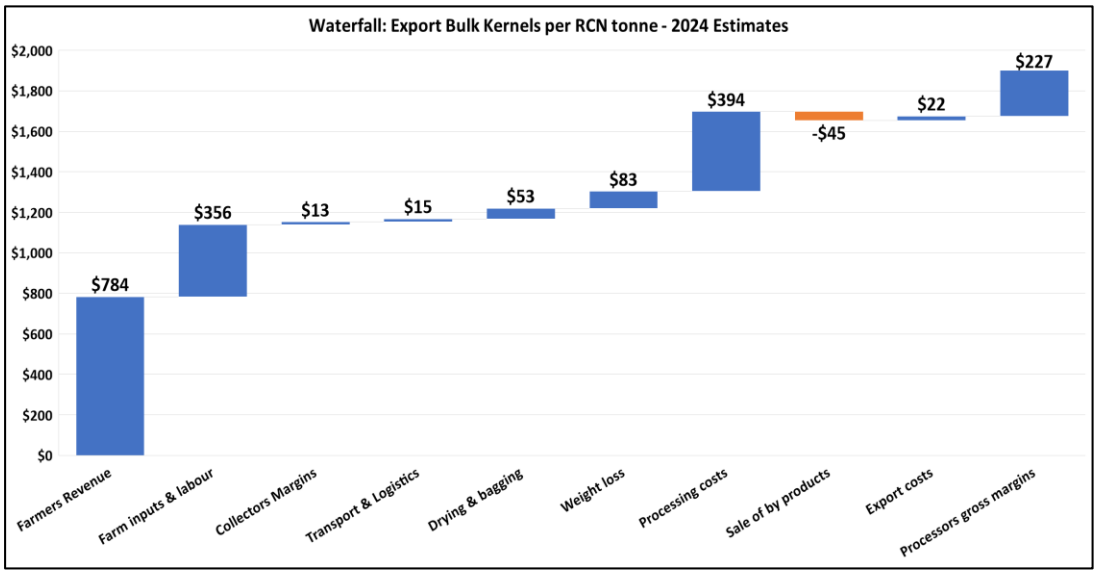
Additional post-harvest handling e.g. drying, bagging, calibration would generate higher sales revenue as seen in other producing countries. Capturing this value would require investment in warehousing, drying yards, calibration and bagging. Farmers would achieve higher value if they dried on farm or more likely if agricultural cooperatives-built capacity in the operation of

post-harvest services. This would also have the advantage of opening the chain to full traceability and other supply chain certifications.

Figure 6.4 by necessity makes more assumptions as the development of processing in Cambodia is at an early stage and data is limited. The assumptions at the farm level are the same as in the RCN export chain although the evidence from Cambodia and other countries is that local processors pay farmers higher prices than the RCN export chain.

For processing costs, we have made modifications to the interview data to bring it in line with the literature and experience in other countries. In the value chain discussion above the cost of processing per tonne of RCN is estimated at three different levels - $280/tonne (interview data for this analysis), $508/tonne (literature) and $625/tonne (interview data micro or very small processors). The waterfall analysis in Figure 6-4 uses US$ 394 per tonne of RCN intake as the cost. It is an average between the high and low for medium to large processors. It is also close to experiences in other new processing countries. Indications are that Cambodian processors due to higher quality RCN and use of technology will achieve lower costs and that therefore the calculations are conservative. It also assumes that processors will sell surplus shell by product as is and not develop further value addition for cashew nutshell liquid. The cost of finance is not considered as there are many different experiences and no method to calculate an average cost based on the available data.

FIGURE 6-4 WATERFALL ANALYSIS CASHEW KERNELS CHAIN



Assumptions:
1. Farmers sell at March market price. / Inputs cost as per research.
2. Processor buys via an agent or collector.
3. Moisture ex farm 17%/ Outturn 29% with 4% processing losses.
4. Market price for sale based on $3.75 per lb FOB WW240 adjusted for grade yield.
5. Gross margin does not include cost of finance, management expenses or return on investment.
6. Costs as per analysis in Chapter 5.
7. Processor sells surplus shell by-product.

6.2 Competitiveness of the Chain

6.2.1 Competitiveness of Cambodian Cashew Nut Production

The Cambodian cashew sector has grown to become the 2nd largest producer globally in 2024 having occupied one of the top three positions each year since 2021. This gives the sector the scale to support the development of a value-added industry of different types and, if used, a significant influence on the future of the World cashew sector. As discussed above it functions largely as an adjunct of the Vietnamese cashew industry so far without post-harvest value addition or infrastructure, low levels of support and a small processing sector.

The Cambodian production model is in stark contrast to most cashew growing countries where cashews are grown on marginal land with lower levels of maintenance and often no use of inputs. The advent of the new tree varieties that offer higher on-farm yields per hectare across the range of provinces on different soils with larger, high quality cashew nuts is a radical change in the growing of cashew nuts compared to other countries. The cultivation of these trees using high levels of inputs and more intensive tree management systems than used elsewhere means that Cambodia leads the World based on average yields across the entire production area. There are examples of high yields in other countries, but these are largely confined to test plots or a few commercial farms.

The advantages of variety are not limited to the new varieties. In areas where there are significant populations of traditional varieties yields are higher in Cambodia than elsewhere. This is demonstrated by the average yield in Ratanakiri which has a significant proportion of traditional varieties and where the new varieties such as M23 yield less than elsewhere due to the landscape (more upland areas) and the soil type.

The competitiveness of the varieties grown is supported by the larger farm size in Cambodia and better access to inputs than is found in other countries. This competitiveness is likely to be sustained as the tree population is young and much of it has not yet reached full productivity.

Production advantages have a cost. The variable production costs are estimated to range from US$ 100-212 per tonne and average US$ 68 per tonne (20%) higher than low-cost models in West Africa, the main competitor from a production perspective. Entry cost in Cambodia is also higher at US$ 200-250 per hectare above African competitors (~75%).

This is more than offset by higher yields which are 3.5 times higher than in Cote d'Ivoire and more than that for West Africa on average. They are also offset by higher outturn yields and nut count although the rewards that farmers receive for these factors are lower than they should by comparison with other high-quality origins as discussed above. One of the key advantages, high nut count, is undermined by the large production of large nuts that are not produced elsewhere and to which the market is not adapted. The preference of Intersnack, as described above, for traditional varieties is not because smaller nuts are better but simply because WW320 are the major grade produced in other countries and demand has been built on that fact.

Cambodia's competitiveness is also helped by its location as neighbour to the largest processing country in the World with an import of RCN every year of between 2.4 and 2.8

million tonnes. Producers have been assured of a market despite the fact that there is very little processing in Cambodia. Location also means that the cost of procurement by Vietnamese processors is less than one third of the cost of procurement including transportation and export taxation in African countries.

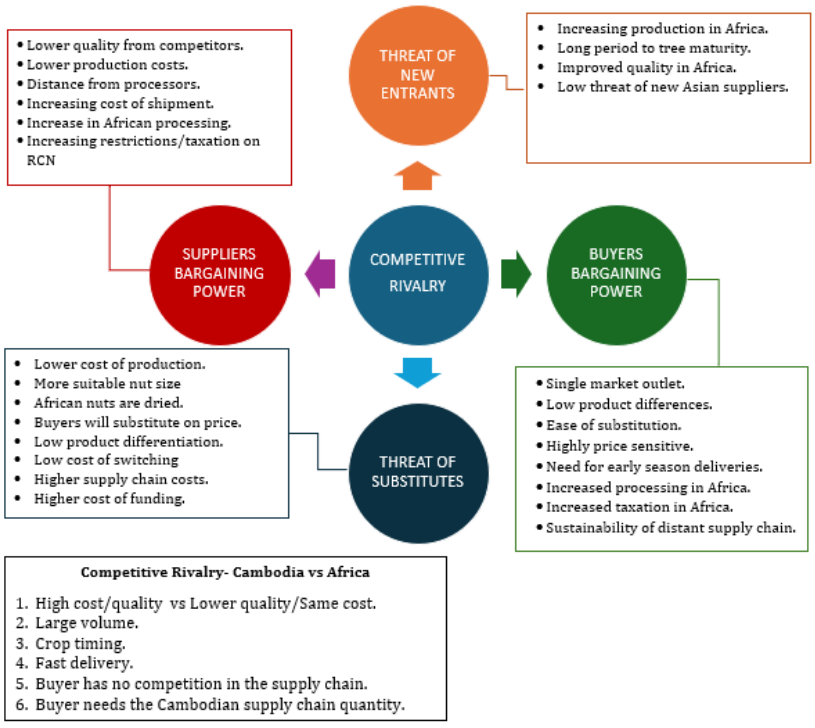
Cambodian cashew competitiveness is exposed to some risks and threats. These are identified in Figure 6-5.

FIGURE 6-5 COMPETITIVENESS CAMBODIAN CASHEW PRODUCTION

Threats to competitiveness.	Risks for competitiveness.
Climate change.	Dependence on one market.
Pests and diseases.	Changes to the Vietnamese cashew sector
Overuse of chemicals in production.	High monoculture (GIZ 2022, 40%)
Lack of post-harvest practice and infrastructure.	Market price volatility
Low levels of production support.	Deforestation.
Low sector cohesion and integration.	Improved yields and quality in Africa.
Lack of market for large nuts.	
Oversupply in the market.	

Taking these factors into consideration we assessed Cambodians competitiveness position in the RCN supply chain using Porters Five Forces Framework[96]. Figure 6-6 is the analysis which concludes that Cambodia is a competitive producer and exporter of RCN but is exposed to the risk of market concentration and the possibility of changes in the destination market.

FIGURE 6-6 CAMBODIA CASHEW PRODUCTION PORTERS FIVE FORCES OF COMPETITION



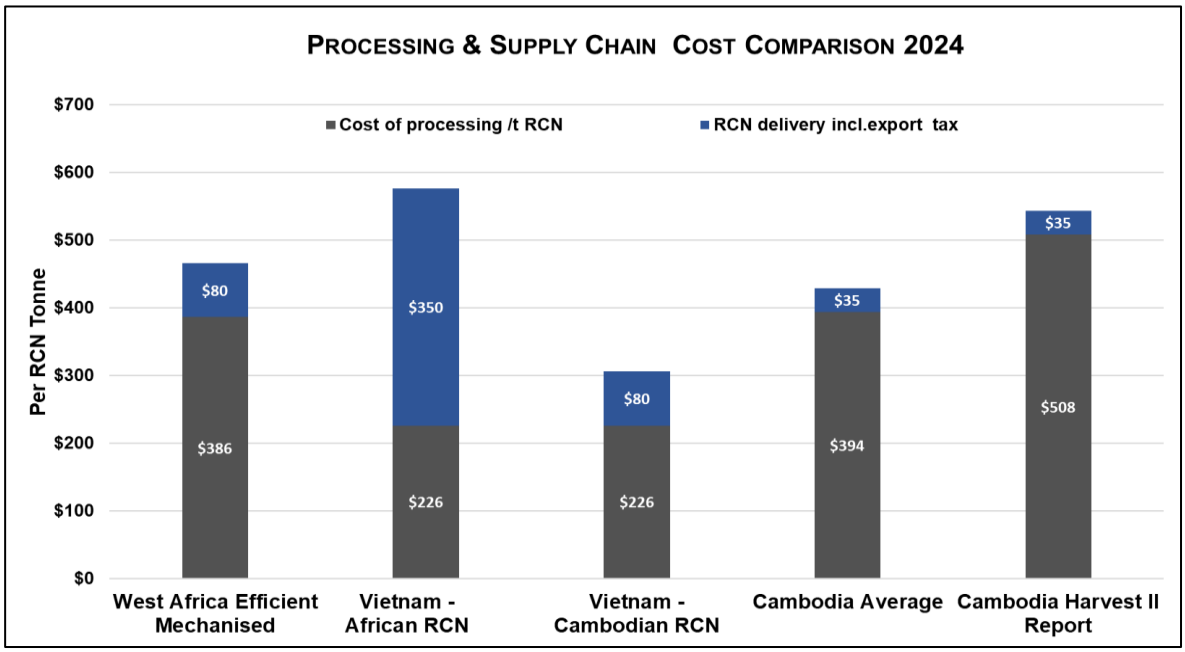
[96] Michael E. Porter, "How Competitive Forces Shape Strategy", Harvard Business Review, May 1979 (Vol. 57, No. 2), pp. 137–145.

6.2.2 Value Addition, Constraints and Competitiveness

Based on the value chain analysis there are promising signs for processing in Cambodia. The cost of processing and the outturn of wholes as well as the size and quality of the kernels produced show that the factors for success in processing are present.

The advantage of being located close to Vietnam as far as the RCN export is concerned works the opposite way for processing. The key challenge for processors is how to compete in the supply chain against large-scale, low-cost Vietnamese processors whose processing facilities are less than a day's drive away with a cost of around US$ 60 per tonne to assemble raw material. Therefore, unlike their competitors in African countries, Cambodian processors do not have the advantage of their nearest competitor having a supply chain cost disadvantage. Figure 6-7 shows the cost comparison between Cambodia, Vietnam (using Cambodian and West African RCN) and modern mechanised processors in West Africa. Vietnam is the most competitive processing country based on costs but has high supply chain costs for the 50%+ that is sourced in West Africa. West African processors can maintain higher processing costs and still be competitive in the supply chain. Cambodia processors do not have this advantage so they must find strategies to be competitive in the supply chain. Some are beginning to do so by paying farmers higher prices, supporting farmers and seeking premium markets for the kernels produced.

FIGURE 6-7 PROCESSING COST COMPARISON



The following is an assessment of the competitiveness of the Cambodian processing sector based on The Factors for Successful Processing developed by the African Cashew Initiative[97], a GIZ project.

Factor	Presence in Cambodia	Competitiveness
Sufficient raw material.	Yes. Prod	Very high
Quality raw material.	High quality raw material.	Very high

[97] Fitzpatrick. J, Competitiveness of the African Cashew Sector, ACi/GIZ, 2010.

Post-Harvest handling.	Absent/Processors must do it.	Very low
Supply chain linkages.	Low or no linkage.	Low
Use of technology.	Export factories have mechanised.	High
Outturn whole grades.	80-90% reported.	Very high
Cost of processing.	Evolving in early stages.	Medium
Access to parts and maintenance.	Good from Vietnam and China.	High
Available managers.	Experience in micro factories but need for training.	Low
Available workers.	Good. Young population willing to work.	Medium with potential
Financial services.	Lack of financial services for small/medium units. Large units source funding from abroad.	Low
Access to logistics.	Higher cost but this is less significant for a high value product like cashew kernels	Medium
Market information.	Poor access to accurate market information.	Low
Marketing & Communication.	Good communication skills but knowledge of buyers' requirements need development.	Medium/Low
By products process & market.	Processors are selling shell. Development of by product processing and market essential.	Medium/Low
Government incentives.	Profits tax incentive 9 years. Duty free import of equipment. VAT relief. 150% tax relief on R&D expenditure. No tax on export of cashew kernels.	Medium
Technical support.	Not yet developed.	Low

The conclusion is that Cambodian processing can be competitive based on either large-scale mechanised plants that can bring processing costs to levels that compete with Vietnam or for smaller plants that they can bring products to the market that command higher levels of value addition.

Key areas for development of competitiveness are in the organisation of the post-harvest segment and the marketing function including branding and product development. If Cambodia is to develop a processing sector that is Cambodian as well as foreign owned, then access to financial services for the investors must be improved particularly in relation to working capital finance.

6.2.3 Ease of Doing Business

Using the World Bank *Ease of Doing Business Ranking* we reviewed Cambodia compared to other producing countries that are competing for investment in cashew processing and have an existing export business in RCN. Within the East Asia region Cambodia is at a low rank at 18th of 25 countries. This is reflected in interview reports of difficulties obtaining export documents, informal trade and payments.

However, considering that the main competition for cashew investment will come from Africa countries there may be some encouragement. Countries that have attracted significant investment in their cashew sectors in recent years are also low ranked in the *Ease of Doing Business* ranking. Cote d'Ivoire (110), Ghana (118), Nigeria (131), Tanzania (141) and Benin (149) have all seen large, mechanised processing units opened in the past five years. Some

countries like Cote d'Ivoire have incentivised cashew investment with direct supports. Others such as Ghana, Benin and Tanzania face similar challenges as Cambodia as processors try to compete against high levels of competition for RCN supply with buyers in India and Vietnam.

There are some key aspects in which Cambodia's rank is low and that are important for developing cashew processing. In the Esat Asia region Cambodia ranks 25th of 25 countries for "Starting a business" and "Dealing with construction permits". Of even greater concern is the ranking at 21st of 25 countries in accessing electricity which is critical for modern cashew units and a key problem for several new processors in West African cashew producers. The investment prospects of the Cambodian cashew sector will improve if these aspects are improved.

6.3 Markets and Marketing

6.3.1 Current and Future Target Markets

Having established that the options for market diversification of RCN are very limited we will focus on the cashew kernels export as the most viable strategy for export market development. In Chapter 5 we reviewed Cambodia's exports of cashew kernels. Cambodia has exported cashews kernels to a range of regional markets including China, Japan and Thailand all of which are demanding markets especially in relation to quality and standards.

There have also been exports to the EU and Saudi Arabia. The EU market has a series of complex requirements that are becoming increasingly difficult for processors that relying on RCN imported from distant origins to meet. Saudi Arabia and other countries in the same region appreciate and are prepared to pay for light colour, large cashew kernels that are not available from Vietnamese production or African RCN. Currently they are supplied by Indian processors at premium prices. At the time of writing the premium for high quality Indian cashew kernels packed for the Middle East is 13% above Vietnamese prices. That represents US$ 16,000 premium for a typical 20 ft container. Markets in Korea and Japan still source significant volumes in India although not at the same level of premium.

Cambodian processors, in order to bridge their early-stage cost disadvantage, must find a marketing strategy to access mainstream high value markets.

6.3.2 How can Cambodian cashew processors compete?

Considering the advantages that Cambodia has in production and the difficulty that processors have and will continue to have competing with Vietnamese processors for raw material the following are suggested as a series of steps that Cambodian processors can take to build resilience and competitiveness.

Step 1 Improve the process

1. Focus on excellence of process and cost management in the processing by investing in management and staff by training and education.
2. Ensure that processing equipment is adapted for Cambodian raw material and climatic conditions.
3. Improve product quality by developing a consistent product of very good appearance and taste. This is in response to the trend in Vietnam over the past twenty years where quality, taste and appearance have been sacrificed in favour of lower cost.

4. Link to buyers for discussion on the specifications that would suit their needs to develop tailored specifications for specific applications that competitors will find difficult to compete and make these available throughout the year.

Step 2 Build the supply chain

1. Form linkages to farmers by supporting the development of local networks and farmer organisations.
2. Support the development of post-harvest management of the crop at farm level.
3. Link to development projects and public institutions to assist with the development of farmer organisations with the objective of achieving a fully traceable supply chain.
4. Certify supply chains for good practice, respect for supplier's rights and risk mitigation e.g. SMETA[98]. This should be done in line with the requirements in the most demanding markets e.g. the currently evolving EU legislation.
5. This should involve encouraging farmers to improve their quality and post-harvest practice rather than extending the production area avoiding the risk of deforestation.
6. Pay farmers premium prices for higher quality products.
7. Consider contract farming.

Step 3 Market based on competitive advantages.

1. Offer premium products in competition with India and African processors with a high-end positioning strategy.
2. Develop a marketing strategy:
   Strategy 1 – high quality bulk kernels to demanding regional markets (most suitable for larger factories).
   Strategy 2 – high quality bulk kernels, sustainably and ethically sourced in compliance with EU regulations taking market share from low quality, unsustainable products produced in Vietnam.
   Strategy 3 – Secondary processing of high quality, sustainable consumer packed cashew kernels with a story. Most suitable for smaller factories.
   Strategy 4 – Encourage domestic consumption.
3. Tell the story of Cambodian cashews by high quality branding and positioning with the support of the development projects and the government to develop a uniquely Cambodian cashew brand.
4. Build a reputation for reliability and contract fidelity by encouraging good dispute resolution processes in the cashew sector.
5. Be informed on the market developments and trends as well as buyers' requirements.

6.3.2 By Products, Cashew Apples and Value Addition

The utilisation of byproducts from processing is an essential part of the management of cashew factories. It is also an important part of the environmental management of waste. In interviews with processors we found that surplus shells were being sold to local traders at values ranging from US$ 60 - 110 per tonne. Shells are also used to fuel the boilers making steam to cook cashew nuts before shelling. This was discussed above.

[98] Sedex.com SMETA Audit

6.3.2.1 The by-products from the processing of cashew nuts play a minor part in the overall profitability of the enterprise nut it is an important feature of processing that all parts of the shell and inner skin (testa) are used in the process or marketed. The sale of by products will initially account for less than 5% of sales revenue based on conservative values for the by-products (US$ 250 per tonne for CNSL and US$ 80 per tonne for shell cake i.e. the shell residue after CNSL removal). However, the management and sale of by products is an important part of the business development. In cases whereby products have not been marketed processors have often eventually paid to dispose of the waste material. Examples are found in Cote d'Ivoire of cashew shells piled up around the perimeter of the factory and of the processor paying up to US$ 70 per tonne for removal of the shell. The utilisation of the by-products is an essential part the management of environmental hazards related to processing. There are opportunities to increase the value of by products which should be considered by every medium or large factory, and which could also consolidate shell from smaller factories.

FIGURE 6-8 BY PRODUCTS OF CASHEW PROCESSING

By product	Use	Market
Cashew nutshell liquid (CNSL) **Outturn 20%** **Recovered 90%.**	Produced for sale by extrusion using a press and storing in a basic oil tank. Delivery out in barrels or bulk tanker.	1. Ideally domestic chemical manufacturers or power generators. 2. International export market for use in high heat applications such as varnishes, brake lining, specialist paints and other industrial uses. Identified markets – Korea, Italy, Belgium, UK, USA. e.g. www.cardolite.com www.cashewchem.com
Cashew nutshell meal or residue after removal of CNSL **Outturn 58%**	60% used as fuel for generation of steam and electricity for processing based on energy need calculation for Vietnamese processing solutions.	The balance sold to the domestic market for fuel uses-power generators or other high heat applications such as brick or tile manufacturing.
Cashew nut testa **0.5%**	Used in dying and tanning and also in animal feed.	Local animal feed or dying uses.
Potential later developments		
1. Refining of cashew nutshell liquid to enhance value with increasing value Crude $200-450/t, Refined $650-750/t and Cardanol $950-1150/t. Investment levels depend on capacity. A basic expeller process may cost as little as US$ 25,000. A basic refinery process ranges from US$ 500,000 – 650,000. A full process to manufacture cardanol or other advanced products will exceed US$ 1 M for a large-scale factory. These estimates are based on the research conducted by the author for prospective factories in Africa and South America.		

2. Small scale gasifier to produce electricity using cashew shells as fuel. This is a high-cost investment which is not, as yet, proven to be the best way to exploit the opportunity for CNSL. It is likely to be more relevant for the residual shell after extraction of the CNSL.
3. Slow burning “charcoal” briquettes for energy applications. This has become a higher profile application for shell residue as a replacement for high-cost petroleum products and to replace wood charcoal in countries where deforestation is a factor.

6.3.2.2 World cashew apple production is estimated in the region of 20 - 30 million tonnes based on typical outturns but there is no conclusive research available. In most producing countries cashew apples, the false fruit of the cashew tree are not commercialised. They are consumed locally fresh during the season, used for local manufacture of alcoholic drinks, or used as cattle feed. The fruits that are not used are left to fertilise the soil and play a key part in minimising the need for fertiliser and soil enrichers for the cashew trees and others crop that grown on the typical smallholder, mixed agriculture farm. Worldwide it is estimated that 95% of cashew apples are not commercialised[99]. Interviews conducted for the analysis reported that cashew apples are not used in Cambodia.

The exception is Brazil. According to Embrapa[100] Cashew apples are used in Brazil for a wide range of applications. In the region of 155,000 tones are used for the manufacture of cashew apple juice and a soft drink called Cajuína annually. Cashew apples are recognised as having a high level of vitamin C up to five times higher than oranges. The cashew juice is often used for mixing with other fruit juices as its taste is somewhat astringent. Brazil has an export sector for cashew juice exporting in the region of 5,000 tonnes per annum. A further 20,000 tonnes are consumed as fresh fruits, 10-12,000 tonnes are used as food ingredients for jams, flavourings, and home cooking products. The animal feed sector consumes 85,000 tonnes as also occurs in India although this may be an unorganised activity where the apples are left in the orchards rather than commercialised for animal feed.

FIGURE 6-9 CASHEW JUICE BRANDS IN BRAZIL

There are difficulties in the commercial exploitation of cashew apples when the primary focus is nut production. In order to ensure nut maturity, the nuts should not be picked from the trees but should be allowed to fall. On the other hand, for the best cashew apple the fruit should be picked from the tree especially if the fruit is to be used for fresh fruit. In addition, the cashew apple must be collected and transported or refrigerated within 24 hours as it will quickly start to ferment and become useless for use as a fresh fruit or fruit juice. Transportation of cashew

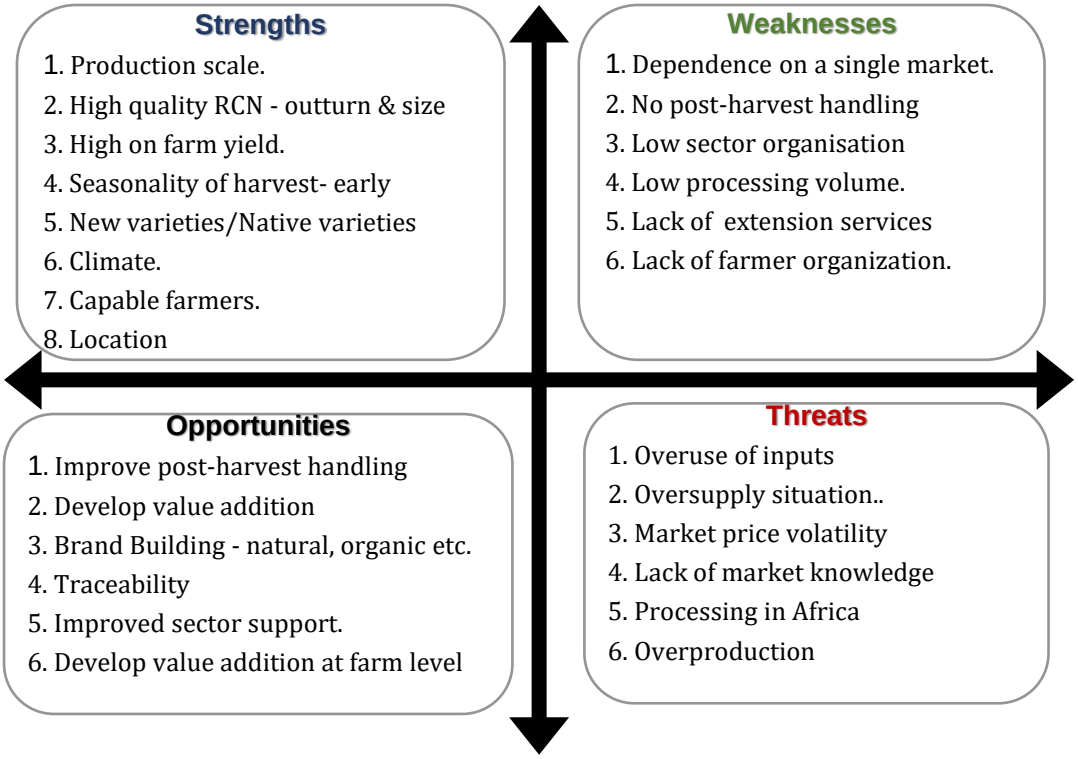
[99] Aluko, Makule, Kassim, Underutilized Cashew Apple Fruit: Its Utility and Development as a Source of Nutrients and Value-Added Products in Tanzania, Current Research in Nutrition and Food Science, 2023.
[100] Brazilian national agricultural research agency.

apples has proved to be challenging as if one bursts and soaks the other in juice, they become useless for fresh fruit usage. It could still be used for the manufacture of alcoholic beverages such as cashew wine or a distilled drink e.g. “feni” in India, brandy in Ghana. The use of cashew apples is limited due to this constraint. Its commercial exploitation is the exception rather than the rule. The commercialisation of cashew fruit in Brazil is possible due to the existence of large plantations.

The marketing options for cashew apples are limited. Without an established local market for the fresh fruit the opportunity to market a low value fruit from a remote area within 24-48 hours is a difficult one. There may be options to build a processing plant manufacturing artisanal jams or other products during the harvest months. This would require a freezer plant as well as the processing equipment.

However, there are some examples. Seeker Spirit company have established a pilot project in cooperation with USAID to make alcoholic drinks from cashew apples. The project is small scale and located in Ratanakiri. Similar projects in West Africa failed due to difficulties marketing the product. There are examples of fruit juice from cashews marketed successfully as part of a wider range of juices e.g. https://www.zenaexoticfruits.com/fr/boisson/ , https://vinut.com.vn .

6.4 SWOT of the Cambodian Cashew Sector



6.5 Risks in the Chain

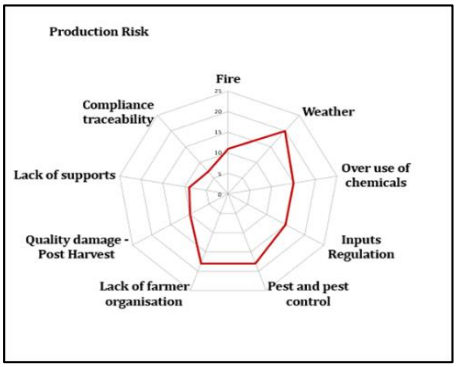
Based on the methodology of risk assessment studies[101] on cashews and the methodology used in ISO 31010:2019 Risk Management - Risk Assessment Techniques[102] a short risk assessment of the Cambodian cashew sector was compiled based on the value chain findings above. Risks were categorised into four categories Production, Market, Strategic and Environmental, Sustainability, Governance (ESG).

The risks identified in the value chain analysis were assessed according to the two factors "Likelihood" and "Impact". They were then evaluated on a combined score scale of 1-25 where 25 is highest "Likelihood/Impact". This gives an overview of the risks that exist or are emerging in the Cambodian cashew sector. It is not a detailed risk assessment which should be conducted for individual interventions or supports as they are initiated assessing risk in greater detail and taking "Likelihood" and "Impact" separately. The risk factors are illustrated in radar charts

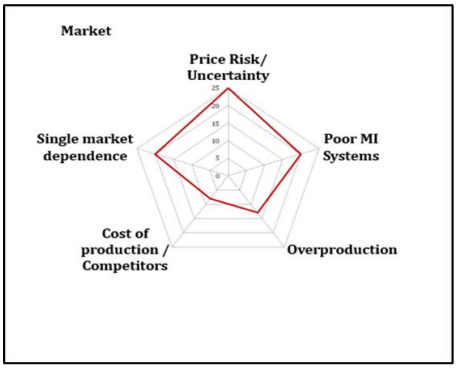
Broadly viewed the risks in the sector are a function of the fast growth of the sector and the Cambodian production model with its high reliance on new plantings, high use of inputs, high yields and, for many farmers, monoculture. These risks are unavoidable in a period of growth especially, as outlined above, when the impact of climate change may require the use of more inputs and create greater volatility in the weather at critical points in the annual growing cycle.

The dependence on a single market is a factor that is recurring across the risk categories as the Vietnamese cashew processing sector is itself under significant pressure due to market price volatility, rising costs and more complex buyer requirements in key markets.

FIGURE 6-11 RISK RADAR CHARTS

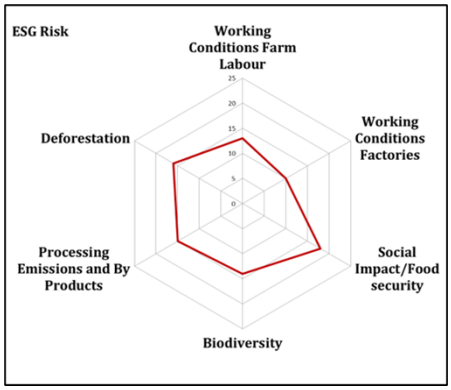


Production risk arises from the combination of the needs of the high yield/new variety model and the growing conditions. They are made more complex by the lack of farmer organisation which makes risk mitigation more difficult and the current system in which the cashew nuts are sold before post-harvest treatment to preserve quality and value.



The cashew market, as outlined above, is characterised by price volatility and poor market information systems that make management of that volatility more difficult. In Cambodia the dependence on a single market that buys RCN only makes the impact of price volatility more impactful. Finding alternatives may be complex due to the prospect of over production and the relatively high cost of production in Cambodia.

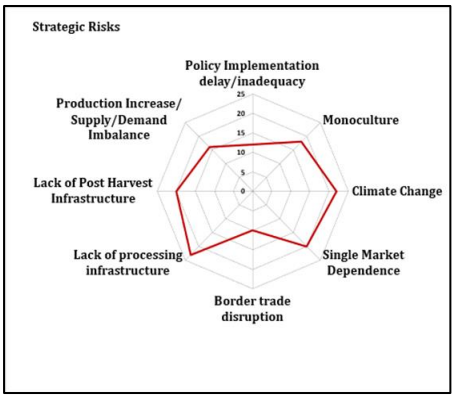
[101] Fitzpatrick. J, Adzanyo.M, Mintah.E, Risk Assessment of the African Cashew Sector, Toward a shared understanding of risk and sustainability, Com Cashew/ IDH 2016.
[102] https://www.iso.org/standard/72140.html



Although cashew trees are recognised throughout the literature as having a low environmental impact, the scale and speed of the growth in Cambodia may increase the risk of deforestation and to a greater extent reduced biodiversity.

There are significant risks to farm livelihoods and food security created by a high dependence on cashew nuts given the market risk and production risk identified above.

Although existing units appear to be low risk there will be risks in the building of the industry especially for workers e.g. contracting, informality.



The strategic risks are the risks that threaten the long-term achievement of the growth, and the goals set by the government for the sector.

They comprise of risks related to the structure and practice in the sector e.g. post-harvest, and policy implementation and monoculture that are potentially controllable and risks that are due to outside factors such as climate change and the global balance of supply and demand.

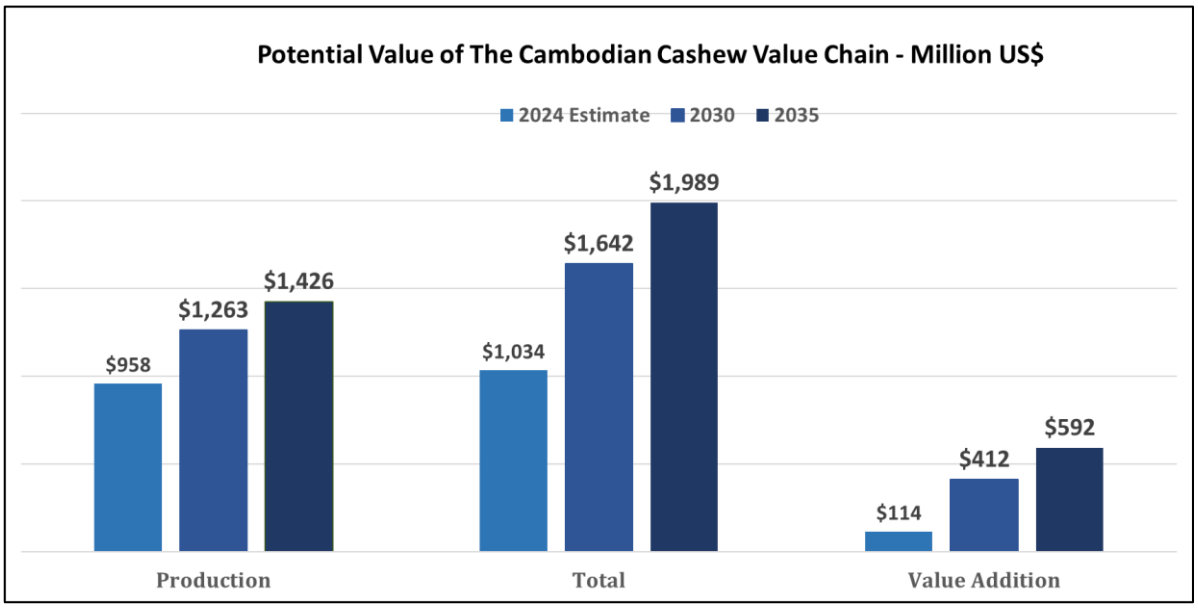
It seems clear that the external risk factors are exacerbated by the structural or internal risk factors in the Cambodian cashew sector.

6.6 Potential of the Cashew Value Chain

The Cambodian cashew sector has developed at a pace and scale that has not been seen previously in the global cashew sector. Based on the value chain analysis this growth may be slowing but there remains a large potential in the development of the sector both at the level production by improved post-harvest and increasing scale and in value addition primarily by the development of primary processing.

Figure 6-12 uses a scenario based on the forecast of production outlined above and the increase of processing capacity to 50% of production by 2030 and 70% of production by 2035. These assumptions are optimistic but achievable as discussed in the value chain analysis. It does not assume any increase or decrease in price as this would introduce an unnecessary level of complexity given that we are discussing potential rather than a forecast. These factors applied to the current status of the sector in 2024 indicate that by 2035 the cashew sector

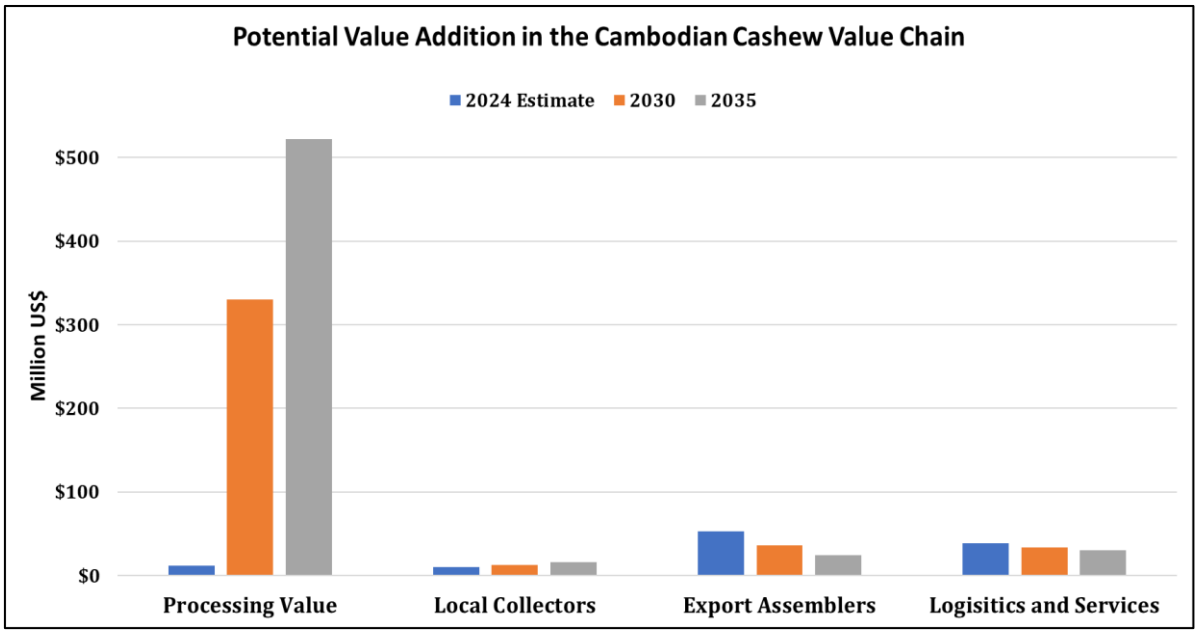
FIGURE 6-12 THE POTENTIAL VALUE OF THE CAMBODIAN CASHEW SECTOR



value could almost double in size to US$ 2 billion. The vast bulk of this sales value would be in the export market. This does not take into account any multiplier impact.

Figure 6.13 distributes the total value addition of just under US$ 600 million among the key stakeholders.

FIGURE 6.13 VALUE ADDED BY SEGMENT



The value added by processing is highest and would exceed US$ 530 million by 2035 achieving the goal of The National Cashew Development Policy. Local collectors would continue to increase their market activity as we estimate that they would continue to supply the export trade but would also provide services between farmers and processors for about 50% of that trade. The balance would be most likely evolve through improved cooperatives and contract farming.

Export assemblers would handle a lower volume of cashews reducing their income from cashews, although it is envisaged that Cambodia would still export more than 550,000 tonnes of RCN most likely to Vietnamese processors. They could rebalance this by providing services of drying, bagging and calibration to the processors and importers and by developing direct linkages to processors without the intervention of Vietnamese agents and traders. Logistics and services are reduced simply because the volume and distance of RCN transported would be reduced. There would be an increase in the forwarding and export services for cashew kernels to partially replace this.

In terms of employment the cashew chain has potential to create between 37,800 and 52,500 direct jobs in semi-mechanised cashew processing factories if 100% of the 2024 crop were processed in Cambodia. This is based on the employment numbers in semi-mechanised factories in Vietnam and African countries. It is more difficult to estimate the numbers employed in post harvest handling as this will depend on the existing warehousing structure. A broad estimate is that there may be an additional 1,000-2,000 jobs in post harvest handling facilities.