USDA/FAS Food for Progress LIFFT-Cashew

SeGaBi Cashew Value Chain Study
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Acronyms

ACA	African Cashew Alliance
ACASEN	Arachide et Cajou du Sénégal
ACE	Audit, Contrôle, et Expertise
ACGB	Association Commerciale de la Guinée-Bissau (Commercial Association of Guinea-Bissau)
ACi	Africa Cashew Initiative (now known as ComCashew)
ACI	Adiantamento Contribucao Industrial (Industrial Tax Advance)
ADPP	Ajuda de Desenvolvimento de Povo para Povo
AFD	Agence Française de Développement
AFI	Association of Food Industries (U.S. cashew kernel standard)
ANAG	Associaçao Nacional dos Agricultores da Guiné Bissau (National Association of Guinea-Bissau Farmers)
ANCA	The National Cashew Agency (of Guinea-Bissau)
ANCAR	Agence Nationale de Conseil Agricole et Rural (of Senegal)
ARIZ	AFD risk-sharing mechanism
ATC-Cajou	Association of Cashew Processors of Guinea-Bissau
BAO	Banco da Occidental
BCI	Banco Comercial e de Investimentos (Mozambique)
BDU	Banco Da União
BHC	Beta-hexachlorocyclohexane
BRC	British Retail Consortium
CAC	Coopératives Agroalimentaires de la Casamance
CAD	cash against documents
CAG	Cashew Alliance of the Gambia
CAGR	compound annual growth rate
Capex	capital expenditure
CCIAS	Câmara de Comércio, Industrial, Agricultura e Serviços da Guine Bissau (Chamber of Commerce, Industry, Agriculture and Services)
CEP (1 & 2)	Senegambia Cashew Value Chain Enhancement Project (phase 1 and phase 2)
CFA	Communauté financière d'Afrique (currency used in Senegal and Guinea-Bissau)
CFE	Centro de Formalização de Empresas (Center for the Formalization of Enterprise)
CICC	Consultative International Council of Cashew
CIESA	Colloquium for Scientific Exchange on Cashew

CNC	Conselho Nacional de Carregadores (National Council of Shippers)
CNFTEFCPN	Centre National de Formation des Techniciens des Eaux, Forêts, Chasses et des Parcs Nationaux (of Senegal)
CNSL	cashew nut shell liquid
COAJOQ	Cooperativa Agri-Pecuària de Jovens Quadros
COFAC	Cadre de Concertation des Opérateurs de la Filière Anacarde de la Casamance
CORAF/WECARD	West and Central African Council for Agricultural Research and Development
CPC	Centro de Promoção do Caju (Cashew Promotion Center)
CPR	Contribucao Predio Rustico
CRCOA	Cadres Régionaux de Concertation des Opérateurs de l'Anacarde (of Senegal)
CSR	corporate social responsibility
DCA	USAID Development Credit Authority
DEFCCS	Direction des Eaux et Forêts, Chasses et de la Conservation des Sols
DGA	Direcção Geral do Ambiente (Customs Directorate)
DGCI	Direcção Geral das Constribuções e Impostos (Guinea Bissau tax authority)
DGPIP	Direcção Geral de Promoção do Investimento Privado (Private Investment Promotion Agency)
ECOWAS	Economic Community of West African States
EIF	Enhanced Integrated Framework
ETLS	ECOWAS Trade Liberalization Scheme
EU	European Union
FAGACE	Fonds Africain de Garantie et de Coopération Economique
FAMVI	Fédération des Associations qui Agissent pour une Meilleure Vie dans les Villages (of Senegal)
FCL	full container loads
FFS	farmer field schools
FIRCA	Fonds Interprofessionnel pour la Recherche et le Conseil Agricoles
FOB	free on board (final price at the port before exportation)
FSMC	food safety management systems
FSSC	Food Safety System Certification
FTE	full time equivalent
FUNDEI	Fundação Guineense para o Desenvolvimento Empresarial Industrial (Guinean Foundation For Industrial Entrepreneurship Development)

FUNPI	Fundo de Promoção à Industrialização de Produtos Agricolas (Fund to Promote the Industrialization of Agricultural Products)
GDP	gross domestic product
GIE	Groupement d'Intérêt Economique
GMD	Gambian dalasi (national currency)
HACCP	Hazard Analysis for Critical Control Point
HR	human resources
IFAD	International Fund for Agricultural Development
IGV	Imposto Geral sobre Vendas (general sales tax)
IMF	International Monetary fund
INPA	Instituto Nacional de Pesquisa Agraria (National Agricultural Research Institute of Guinea-Bissau)
IRD	International Relief and Development
IRR	internal rate of return
ISO	International Standards Organization
ISRA	Institut Sénégalais de Recherches Agricoles (Senegalese Agricultural Research Institute)
ITC	International Trade Centre
KAFO	a national farmer federation in Guinea-Bissau
KOR	kernel output ratio
LC	letter of credit
LIFFT-Cashew	Linking Infrastructure, Finance, and Farms To Cashew program
MFI	microfinance institution
MIS	Market Information System
MOA	Ministry of Agriculture (of the Gambia)
MOD	customs duty in Guinea-Bissau
MT	metric tonne
MW	megawatt
NACOFAG	the Network of Farmers and Producers Association of The Gambia
NARI	National Agricultural Research Institute (of the Gambia)
NGO	non-governmental organization
NPV	net present value
OPIC	U.S. Overseas Private Investment Corporation
OPRO	Producers' Organization of the Region of Oio
PADEC	Programme d'Appui au Développement Economique de la Casamance
PASA	Projet Anacardier Senegalo-Allemand
PPP	public-private partnership

PRSPDA	Private Sector Rehabilitation & Agribusiness Development Project
PSAC	Projet d'Appui au Secteur Agricole en Côte d'Ivoire
R&D	research and development
RCN	raw cashew nut
REDDA	Reseau de Recherche et Development sur l'Anacarde en Afrique
ROE	return on equity
ROI	return on investment
ROW	rest of world
SeGaBi	Senegal, the Gambia, and Guinea-Bissau
SFL	Shelter For Life International
SGS	Société Générale de Surveillance
SME	small and medium scale enterprise
SODENAS	Société de Décorticage des Noix d'Anacarde du Sénégal
TIE	customs duty in Guinea-Bissau
TIPS	trade and investment promotion support
UNDP	UN Development Programme
US	United States
USAID	U.S. Agency for International Development
USD	United States dollar
USDA	U.S. Department of Agriculture
USDA/FAS	USDA Foreign Agricultural Service
VAT	value added tax
WCC	World Cashew Convention

Definition of Technical Terms

AFI standards	International standards managed by the Association of Food Industries that all processors must comply with prior to exporting processed food
Cashew by-product	Cashew apple, cashew shell, cashew husks, and CNSL
Classification/ grading (e.g. WW320)	Kernels are graded on color, shape, and size. Color can be white (W), scorched (S), or dessert (D). Shape can be whole (W), split (S), or broken (B). Size (i.e. the number) is measured as the number of kernels per pound and is only included for whole kernels. Therefore, no number means broken kernels. WW320, for example, is white wholes, 320 kernels per pound. White wholes are sometimes written with a single W, such as W320. The grading process can be manual or mechanized
De-shelling	Nuts are deshelled to free kernels out of shell bounds
Export-scale processors	Facilities processing more than 1,000 MT per year of RCN and serve international large-scale kernel buyers.
Hybrid processing	Processing step during which both manual and mechanized activities are realized
Kernel conversion ratio (yield)	The kernel conversion ratio (or yield), expressed as a percentage, is measured at the packaging stage as the weight of kernels (after accounting for weight losses due to humidity (6 percent), peeling (12 percent), and grading/sorting (3 percent)) derived from an 80 kg bag of RCN. Using this formula, if the out-turn rate is 51 lbs, for example, the kernel conversion ratio is ~23 percent.
Kernel output ratio (KOR)/ out-turn rate	Quality is expressed in kernel output ratio (KOR), also referred to as the out-turn rate, which is measured at the de-shelling stage as the weight of usable kernels in pounds (lbs) per bag of cashew nuts (80 kg or 176 lbs.). For example, the global average out-turn is 51 lbs.
Large-scale processors	Facilities processing more than 10,000 tons per year (these do not exist in the SeGaBi region at this point)
Manual processing	Shelling, peeling, and sorting are done manually. This model requires a high skill level of workers
Mechanized processing	Shelling, peeling, and sorting are done with the help of equipment and requires limited workers. Products are transported by conveyors from one area to another
Mix model	Mix of technologies from diverse origins
Nut count	The number of RCN per kg, usually between 150 and 240 RCN/kg. A smaller count represents a larger nut, and is therefore

	considered of better quality. The KOR/out-turn rate, however, is a better measure of quality since a large nut does not necessarily mean a large kernel.
Peeling	Kernels are peeled, removing the outer layer of skin. This activity can be done manually or with the help of equipment
Semi-mechanized processing	Shelling, peeling, and sorting are done with the help of equipment, requiring fewer workers for recovery of kernels
Small-scale processors	Facilities processing below the threshold for international markets, or 1,000 tons of RCN processed per year. They serve domestic or regional markets, or occasionally overseas niche markets for Organic or FairTrade nuts.
Special investment zone	Geographic location which provides additional benefits from the Government
Specialty markets	Markets besides mainstream traditional markets, usually requiring special certifications or other documentation and providing a premium in markets, such as organic, fair trade, traceable, etc.
Toll processing	An arrangement in which a processing facility (which has specialized equipment) processes raw cashew nut or partially processed cashew nut for another company, often a kernel distributer, for a fee. This type of processing is less risky, since by definition off-take is guaranteed. It is also a fallback option for processors who do not have access to working capital to purchase RCN.
Top working	A technique, similar to grafting, that is used to rejuvenate unproductive cashew trees. This involves removing the head of trees, allowing young shoots to break out.

1 Executive summary

The global cashew market has become a $12 billion industry. This growth is largely driven by burgeoning kernel consumption thanks to greater awareness of cashew's health benefits and rising incomes in key markets like India and China. Indeed, consumption reached an all-time high in 2017. Growth in kernel demand has spurred soaring demand for raw cashew nuts (RCN), the primary exportable product of the cashew tree, with demand doubling from 2010 to 2015. Global cashew demand is already outstripping processed supply, and the gap is projected to widen within the near future**.** This shortage creates opportunities for cashew production and processing in new and emerging production zones, particularly in West Africa, where RCN quality is already high and processing has large untapped potential.

West Africa is the fastest growing producer among all cashew producing regions, growing at a staggering 10 percent over the past decade. In 2017 alone, RCN production in West Africa is estimated to have reached nearly 1.5 million metric tons (MT), accounting for more than 43 percent of the world's supply. However, when it comes to processing, West Africa is far behind producing giants such as India and Vietnam, who currently process a combined 92 percent of the world's supply of RCN. The current limited local processing capacity results in West African processors and smallholder farmers missing out on approximately 60 percent of value-added income. Though the processing industry in West African nations is in its infancy, two market forces present the region with a clear opportunity for expansion: (1) present the need to diversify the global cashew kernel supply chain, which is currently dominated by Vietnam; and, (2) increasing consumer demand for food safety and traceability, which are easier implemented by Africa's local sourcing model. With strategic and concerted support from their respective governments and technical assistance, the region could soon grow to be a global force.

The Senegal, the Gambia, and Guinea-Bissau (SeGaBi) sub-region accounts for 17 percent of West African RCN production. SeGaBi produces around 250,000 MT of RCN, 80 percent of which comes from Guinea-Bissau, followed by 17 percent from Senegal, and 3 percent from the Gambia. Growth prospects in SeGaBi are positive, as the majority of its trees are either yet to peak, or are just hitting their peak. This will result in improving yields and outputs over the coming years. However, the cashew value chain in SeGaBi is constrained by weak access to finance, poor infrastructure, limited investment in research and development, limited application of best practices, high dependence on RCN exports, and an absence of established market information systems. Formalized border trade between the three countries would significantly benefit the economies of all countries. In addition, regional collaboration across research, new planting material (grafted seedlings), and extension models would result in significant benefits for all countries.

Guinea-Bissau is the fifth largest RCN producer in the world, growing quicker than the industry average at six percent per year. The country is known for its high-quality nuts, which, due to their high outturn ratio, command a premium of about $100–300 per MT of RCN compared to other countries in the region. However, the domestic processing sector has not kept pace with production growth and Guinea-Bissau exports approximately 98 percent of these high-quality nuts in raw form. The value chain is constrained by uneven technical capacity among farmers, a weak processing industry, and poor integration with the global cashew market. Despite these challenges, Guinea-Bissau could boost domestic production significantly by developing appropriate technical packages for farmers and offering improved extension services. RCN processing remains viable and could develop dramatically through greater access to finance, enhanced technical and business knowledge, improved supply of reliable electricity, and the introduction of more favorable kernel policies.

Senegal, though growing smaller volumes than Guinea-Bissau, has experienced a seven percent growth rate, with RCN production nearly doubling over the past decade. Cashew is a relatively new source of income for Senegalese farmers, but is already emerging as an important sector for the Senegalese economy. There is significant room for production expansion as currently less than 1 percent of the Senegalese territory is under cashew cultivation (compared to 20 percent in Guinea-Bissau). As such, the Government has made consistent efforts to sustain the growth rate over the near future. Senegalese processing also lags behind Guinea-Bissau, with only around 500 MT of RCN processed locally in 2017, out of an estimated 32,000 MT of RCN produced. However, with enhanced capacity of farmers in good agronomic practices and improved farmer organization, Senegal could rapidly ramp-up its RCN production to a level that could eventually sustain the growth of a domestic processing industry, especially by targeting specialty and niche markets.

The Gambia is the smallest producer of the three SeGaBi countries, producing an estimated 12,000 MT of RCN in 2017. Despite its relatively small production volumes, the Gambia's growth rate of 15 percent over the past decade has been substantial for a country of its size. In recent years, Gambian raw nut prices have been notably higher than in Guinea-Bissau and Senegal. This, coupled with the low relative port charges in Banjul, favor raw nut production and exports over processing. Additionally, due to low RCN volumes and weak sector organization, domestic production is unlikely to be able to support a fledging processing industry, making prospects for export-oriented processing in the short to medium term unviable. However, processing for specialty and niche markets, including the domestic tourist industry, remains a potential opportunity for value addition. Furthermore, profitability for Gambian cashew farmers remains high, as production economics are the best in the sub-region. Enhanced technical capacity of farmers, coupled with improved access to finance could help Gambian farmers expand from small farms into commercial plantations.

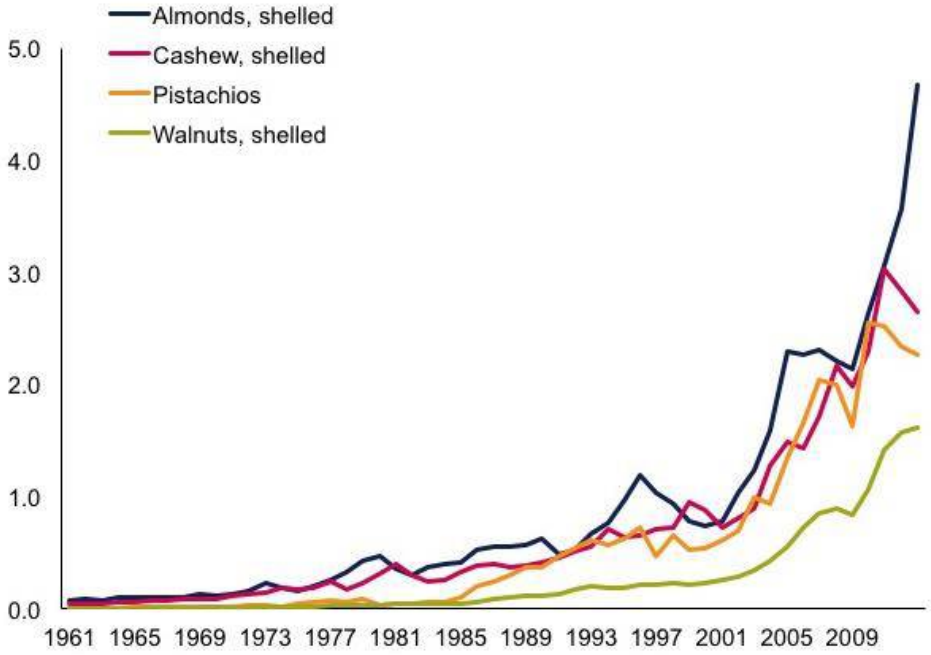
Based on a deep analysis and considering global cashew trends, the following have been identified as key priorities to support the growth of the cashew sector in SeGaBi.

- **Regional**: Formalized border trade between Guinea-Bissau, Senegal, and the Gambia would result in win-win situation for all countries. The countries should consider collaborating on cross-border policies to collect duties, which would allow Guinea-Bissau to experience lower unofficial trade and generate higher duty revenues; Senegal to achieve increased volume of officially traded RCN, with scale benefits; and the Gambia to achieve increased official export and income. In addition, regional collaboration across research, new planting material (grafted seedlings), and extension models would result in significant benefits for all three countries. Given that access to finance challenges are similar in each country, SeGaBi could also develop common strategies to deal with access to finance challenges from a regional level.
- **Guinea-Bissau**: There is an urgent need for improved maintenance of farms, disease treatment, and new planting support to maintain the current production levels and sustain growth. There is already sufficient production and conducive policies to incubate a sustainable processing industry. Key priorities are to sustain current production and growth, while focusing on increasing domestic processing, and improving sector organization.
- **Senegal**: Current RCN production levels are sub-optimal for domestic processing and there is no export duty on RCN, which renders domestic processing uncompetitive. As a result, key priorities are to focus on increasing production levels, developing a niche in organic RCN production, expanding processing for specialty markets, and facilitating increased trade from Guinea-Bissau.
- **The Gambia**: With overall low production volumes, coupled with the main port being located very close to production zones, RCN export is very efficient, while domestic processing is uncompetitive. As a result, the number one priority is to focus on increasing production and expanding RCN exports.

2 Introduction

As one of the four most produced tree nuts globally, demand for cashews in middle-income countries has increased over the last few decades alongside rising incomes. More recently, richer countries have followed suit. Driven by health trends, consumers in high-income countries are eating more cashews as a healthy snack and in the form of milk, bars, and butter. As a result, global demand for cashew has increased by an estimated 87 percent over the past ten years' on average, up to 34 percent in the last year alone.[1] This demand is expected to increase as European and North American consumers search for new plant-based protein sources and the middle class expands in Asia.

Exhibit 1: Value of global nut exports, billion US$[2]



Despite unparalleled growth in cashew production since 2010, especially in West Africa, supply has not been able to keep up with demand. Consequently, global prices for RCN and kernels have soared at an annual growth rate of eight percent.[3] In addition, many of the increasingly important RCN producers in Africa still process very little domestically and ship raw nuts to processors in India and Vietnam, foregoing significant value added income.[4]

[1] INC, 2016, p.13
[2] FAOSTAT Database, 2017; Data is only presented through 2009 as more recent data is known to be unreliable.
[3] TechnoServe analysis based on multiple sources
[4] Gro Intelligence, 2016

This provides a unique opportunity for cashew producing countries in West Africa to increase their cashew production and processing in order to grow their economies, raise the income of farmers and processors, and generate foreign exchange through expanded exports. This report details this opportunity in three West African countries – Guinea-Bissau, Senegal, and the Gambia.

The objective of this study is to inform an upcoming six-year USDA/FAS Food for Progress project known as the Linking Infrastructure, Finance, and Farms To Cashew (LIFFT-Cashew) program, implemented by Shelter For Life International. To that end, this report covers a set of targeted topics. General background information on the cashew tree and trade is provided. The global context is outlined, followed by detailed descriptions of the value chain from the tree to the port in each country. Thereafter, the report includes a regional analysis of the SeGaBi value chain and benchmarks the competitiveness of cashew producing countries in the region and beyond and identifies key priorities for each of the focus countries to strengthen their long-term position in the cashew industry. Finally, the report highlights recommendations for the LIFFT-Cashew program in order to promote the profitability and competitiveness of the cashew sector in Guinea-Bissau, Senegal, and the Gambia.

3 Methodology

TechnoServe's strategy for conducting this value-chain study was two-pronged: (1) leverage our extensive past experience and existing knowledge database, while (2) being demand-driven in executing analysis and making recommendations. TechnoServe has experience conducting analysis for more than 30 cashew sector studies across 10 African nations, and for six different clients/donors. Additionally, TechnoServe has been active in the SeGaBi region since 2010, executing various short-term projects. This study was led by experts who have a proven track record of working in Sub-Saharan Africa, a clear understanding of cashew sector dynamics, and have strong relationships with established networks across the cashew industry of SeGaBi.

To draw analyses and make recommendations, TechnoServe utilized a demand-driven approach, i.e. understanding the key needs of end consumers/markets that SeGaBi serves and working backwards to identify which areas within the existing value chain need critical intervention to meet these demands. To build a clear idea of the current market demands and its key drivers, TechnoServe convened a series of meetings/conference calls with global and local stakeholders and experts to build a high-level hypothesis that drove this study.

Based on TechnoServe's extensive experience in executing cashew sector value-chain analyses in Sub-Saharan Africa, the team developed a robust methodology that included the following steps that are detailed below:

1. Desk research and literature review
2. Data collection (primary and expert interviews)
3. Analysis and report writing

During data collection and field work, TechnoServe held 52 interviews with 121 participants. This included 22 interviews in Guinea-Bissau with 30 individuals, 20 interviews in Senegal with 66 individuals, and 10 interviews in the Gambia with 25 individuals.[5]

3.1 Desk research and literature review

The study kicked-off with a comprehensive review of existing literature on the cashew sector. To leverage existing resources, desk research included both internal and external literature and data. The team thoroughly reviewed Shelter For Life International (SFL)-provided documentation related to the assumptions made in order to ensure alignment of the desk research and analysis with the proposed LIFFT-Cashew program design.

TechnoServe collaborated closely with SFL staff to ensure that the data collection and research tools, including surveys and interview questionnaires, and key research questions are aligned with their objectives. Given the short duration of the study, research

[5] Given its smaller size, industry weight, and comparative impact potential, less time was allocated to the Gambia.

inputs that could not be gathered via primary interviews were extrapolated from secondary literature.

3.2 Data collection

For maximum efficiency, TechnoServe conducted primary interviews via in-person meetings and phone calls. TechnoServe categorized the list of stakeholders from high to low priority based on their cashew sector expertise and current professional role. For high priority stakeholders, in-person interviews were prioritized as the preferred mode and when individuals from this category were not available, TechnoServe resorted to phone interviews. For other lower priority stakeholders, interviews were conducted via phone.

For interview setup, TechnoServe leveraged its already developed networks amongst processors and other stakeholders within the region. The team leveraged the knowledge of these stakeholders to make connections to other, newer actors in the value chain. When necessary, TechnoServe sought assistance from SFL staff within the region for support conducting primary interviews. Stakeholder and expert interviews included, but were not limited to:

- Major stakeholders: nursery managers, farmers, aggregators and middlemen, nut and by-product processors, exporters, and buyers
- Business service providers: financial institutions, transporters, equipment manufacturers, trade associations
- Government and other stakeholders: extension workers, ministry POCs, and NGOs

Key interview guides can be found in the annexes of this report. Interviews involving other stakeholders were conducted based on these guides, but modified to the stakeholder. In all cases, TechnoServe remained flexible, adapting the approach and exact questions to the specific individual interviewed.

3.3 Analysis and report writing

Post primary interviews and data collection, TechnoServe conducted a series of analyses of the gathered data to generate key insights on the cashew sector of the SeGaBi region. The types of analysis conducted include:

- Landscape analysis to provide global overview of cashew sector (global production and processing data, historical price of cashew products, etc.).
- Gap analysis to identify opportunities and weaknesses within the value chain (RCN demand and movement amongst stakeholders, trade data, government and private investments, etc.).
- Competitive benchmarking analysis of profitability and qualitative factors.
- Report development including description of the value chain, sector statistics, sector mapping, network analysis, challenges and opportunities in the value chain, and program recommendations.

3.4 A note on Senegalese and Gambian cashew sector information

Given cashew's relatively new role in the economies of Senegal and the Gambia, the availability of information on these countries' cashew sectors is limited by comparison with Guinea-Bissau. For example, their governments do not currently collect official data on cashew cultivation and trade associations are only nascent. Senegalese and Gambian cashew production statistics that are available vary from one source to another, with most figures drawn from interview-based methodology. It is important to verify the credibility of field interviews, especially related to production figures as these are easily misrepresented as a result of high-volumes of cross-border RCN trading. Other statistics, including farm size, yield, tree age, and population dependency also vary largely by source. There is a need for more detailed work to calibrate these statistics, especially at a sub-regional level. The data presented in this report is, therefore, based on an analysis of many sources, including stakeholder interviews, RONGEAD, CashewInfo, World Cashew Convention panel discussions, donor project reports, and port data, with cross-checking based on TechnoServe's extensive history monitoring these statistics. In addition, any imbalances between the different country-level value chain analyses in this report are a result of the imbalances that exist in the general availability of existing, publicly-available information and in-country sector knowledge.

4 General cashew background information

The global cashew market is supplied by millions of smallholder farmers across several continents, with average plantation sizes in the range of one to three hectares. In India, the world's largest producer of cashew, average land holdings are even smaller. For many producing households, cashew is grown as the only cash crop. The rise in RCN prices over the last decade has provided cashew farmers and their families with a good source of income.

The cashew tree (*Anacardium occidentale*) is a tropical evergreen tree that is best suited for deep, well-drained sandy or sandy loamy soils. The tree is native to Brazil and is now grown in Asia, Africa, and Central America.[6] Cashew is adapted to a variety of soils and can produce with rainfall per annum as low as 500 mm or as high as 3750 mm, though production is optimal with 900-3,000 mm per annum.[7] With a well-developed root system, cashew trees are considered highly drought resistant.

The tree produces a cashew apple and a kidney-shaped nut, which is the true fruit. The nut is strong and does not split open after drying. What is known as the edible cashew nut, is a seed that is 2-3 cm in size and found within the outer shell. It is technically known as the cashew kernel. As the nut matures, the peduncle at the base swells into a fleshy, bell-shaped stalk producing a false-fruit that is commonly referred to as the cashew apple. The cashew apple is edible, with a thin-skin, containing a yellowish-orangeish-reddish juicy and spongy flesh. The taste is acidic and slightly astringent when eaten raw and extremely astringent when green.[8]

4.1 Production

Trees propagated by seed should start to produce fruit in the third to fifth year and reach their peak in years 9-10. Comparatively, trees propagated by grafted seedlings typically start to produce fruit in the second to third year and reach their peak in years 7-8. Due to the shorter gestation period, propagation by grafting is the preferred planting method. Trees planted using un-grafted seedlings provide only a marginal added value over

[6] Catarino, Menezes, and Sardinha, 2015
[7] Practical Action, 2001
[8] Ibid

seeds. The productivity of cashew trees begins to decline after the tree reaches 25-30 years.

Key challenges that may constrain the productivity of a cashew farm include lack of orchard maintenance, poor tree rehabilitation, overcrowding, poor protection of young trees from large livestock and animals, and cutting for fuel wood or other purposes. Cashew trees may also suffer from pests and diseases, if not cared for properly.

Proper spacing at the time of planting is critical. Nuts occur at the margins of the crown of foliage. Optimal spacing of 8-10 meters between plants allows the tree canopy to fall freely on all sides to create extra space for production.

Cashew farms also require routine maintenance, including weeding and cleaning of other plant species. Shrubs, grass, and indigenous trees are often grown on cashew plantations and without proper care, the plantations can become forests. This makes the passage of harvesters difficult and ultimately reduces productivity as volumes of fruit and nuts are inaccessible and left to spoil. Furthermore, when cashew plantations are not maintained, there is an increased competition for vital nutrients and sunlight among the shrubs, grass, and unwanted new cashew trees that renders older trees more vulnerable to diseases. Routine thinning and pruning of young trees is also necessary to remove unwanted branches.

Proper care for a cashew farm also includes replacement of old trees. This is critical for successful cashew farms and entails several steps: identification of unproductive trees; identification of rehabilitation needs; and systematic replacement of trees. Tree replacement must take into consideration both timing and approach (seed, seedlings, etc.). It is important that replacement of cashew trees is done using the appropriate variety—one that has been properly selected to suit the production conditions of the region.

Top working and canopy substitution are other important maintenance techniques that allows farmers to rejuvenate unproductive trees without requiring full replacement. Trees of 20 to 25 years old are beheaded at a height of 0.5 m from the ground during April-May (appropriate time period for SeGaBi). A paste, made using 50 g, each of BHC 50 percent water soluble powder and copper oxychloride in a liter of water, should be applied all over the stump to check any infection by invading pathogens and borer insects. Profuse sprouting normally results in only 10 to 15 healthy shoots – all others should be removed to ensure proper spacing. The remaining healthy shoots are grafted at softwood stage (cleft grafting) when they are about 40 to 50 days old. Seven to eight successful grafts may be encouraged to grow and the sprouts should be periodically removed. Top worked trees grow vigorously due to the well-established root system and they start yielding about 4 kg per tree from the second year of rejuvenation. Yields then gradually stabilize at 8 kg from the fourth year after top working

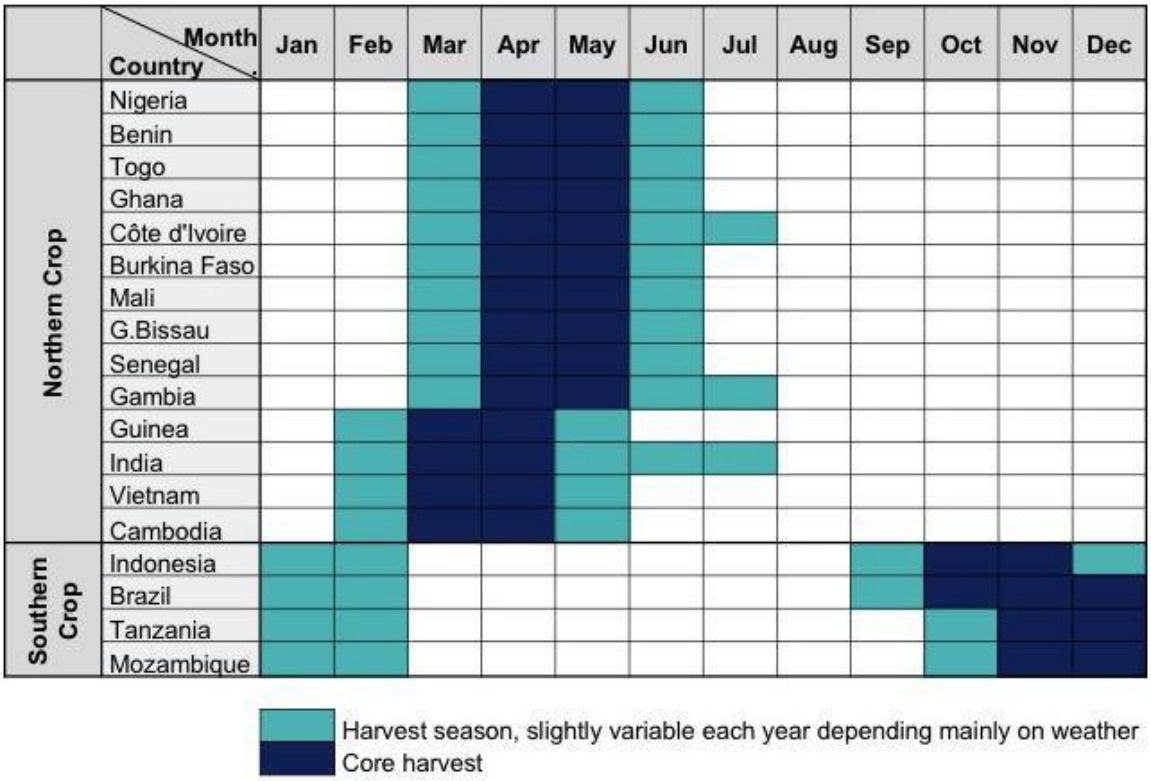
Livestock and animals can also be a constraint to farm productivity. While livestock contribute positively to cashew farms by controlling weeds and fertilizing the soil, large animals such as cows can harm young trees if not properly restrained. In general, it takes cashew trees about five years to mature before they reach the size where they are no longer vulnerable to cows. Young, not fully-grown trees are susceptible to trampling of cows and may be stunted or killed completely.

Another practice that harms the productivity of a cashew farm is cutting. When cashew trees are cut for firewood or other uses, they are left vulnerable to pest attacks like stem borer. Stem borer can also infect old stems and stem holes that have not been treated properly. Stem borer infections multiply fast, particularly in old and abandoned plantations and result in a considerable loss of production, with severe attacks capable of killing off entire plantations.

4.2 Seasonality

Another important global cashew production dynamic is seasonality. Generally, the harvest season in cashew producing countries in the Northern Hemisphere extends between February and July. Each country's core harvest typically takes place over a period of two months from March through April. In the Southern Hemisphere, generally the harvest season extends between August and February, with the two months between October and December as the core harvest period. The extent of the harvest period in each country is slightly variable each year, mostly due to weather conditions. The exhibit below presents the harvest period for cashew producing countries in both hemispheres.

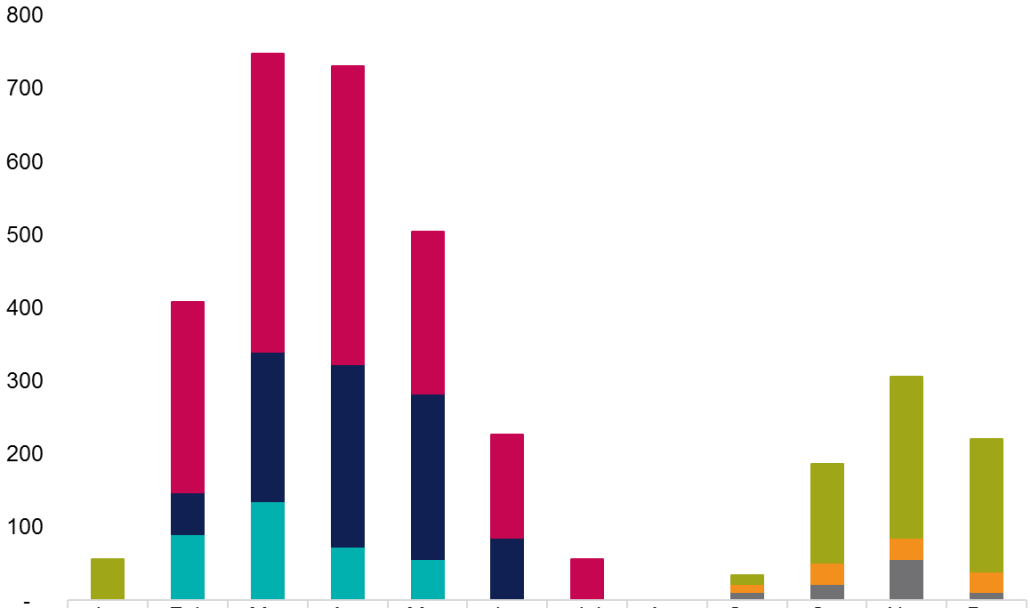
Exhibit 2: RCN harvest season by country[9]



The exhibit below also looks at the dynamic of seasonality, showing RCN volumes harvested and traded by key producing country or region and month. Because the Northern Hemisphere produces the majority of global RCN, RCN trading peaks in March, April, and May. World production is divided into two zones: southern crop, which consists of eastern and southern Africa, Brazil, and one month of overlap in Indonesia, and; northern crop, which constitutes almost 82 percent of overall production and includes India, West Africa, and Southeast Asia.

[9] ITC and MOT, 2013, p.3

Exhibit 3: 2017 Global RCN harvest split by key producing country/region and month (thousands, MT)[10]



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
East Africa	57	-	-	-	-	-	-	-	11	136	221	181
Indonesia	-	-	-	-	-	-	-	-	11	28	28	28
Brazil & Latin Am.	-	-	-	-	-	-	-	-	11	23	57	11
West Africa	-	260	408	408	221	142	57	-	-	-	-	-
India	-	57	204	249	226	85	-	-	-	-	-	-
Vietnam & Cambodia	-	91	136	74	57	-	-	-	-	-	-	-

4.3 Processing

Processing aims at extracting the cashew kernel from the raw cashew nut. Overall, the major trends and lessons learned through processing successes to date have been summarized as the following:

- Higher investment capital (i.e. equity) leads to lower processing costs, thanks to the ability to purchase more efficient equipment and lower financing costs.
- Management skills are essential, since processing competitiveness depends on cost efficiency, which is driven by key management decisions like mechanization and technology choices, and operational processes.
- Workers' skill levels are less important, since - due to mechanization - they are increasingly only involved in recovery operations, like scooping kernels out of shells and quality control. Labor costs, however, are increasing fast in India and

[10] Production figures in this exhibit were compiled using expert analysis and review of production figures calculated using Fitzpatrick (2017) production model; TechnoServe production model; TechnoServe analysis.

Vietnam and the cost of labor will be major factors in the future of processing competitiveness.

- The implementation of a proper food safety management system is key to tap certain markets.
- Proper equipment selection is a key to success. Processors are often overwhelmed by choice: there are over 56 equipment suppliers, with new ones entering the market each month, and new technologies are being produced at a similarly rapid rate. Many processors rely on outside advice to select machinery, but they do not necessarily have access to a true, unbiased expert. A poor, uninformed choice can be disastrous: if equipment malfunctions, or performs less efficiently than promised, a processor may not be able to achieve margins large enough to stay in business.
- Small factories are less competitive than export-scale factories. To tap the full potential of export markets, the scale of processing is key. Processing at scale is a prerequisite to being able to produce enough to practice economically AFI grading standard and to meet the minimum needed for food safety compliance measures. Today, minimum viable scale for export markets is around 1,000 MT of RCN per year. Markets need container loads composed of minimum grades/container, preferably full container loads of single grade as well as consistent supply throughout the year. Scale is also important for processors to use mechanized technology at its optimum level. In addition, it is also difficult for small facilities to attract and pay management that is skilled enough to efficiently manage processing operations.

To ensure a successful processing business, processors must take into consideration all of the following:

- The right profile description and characteristics of an investor
- Global, regional, and national competitiveness
- Complete know-how, including technical processing knowledge as well as business and financial skillsets
- Sufficient scale: for cashew processing, 1,000 MT is needed to justify minimum investments (for traditional export markets; for organic or specialty markets, small scale is not an issue)
- Hands on training of managers, supervisors and workers on techniques and food safety
- Procurement of RCN and logistics management
- Loss tracing, batch processing (traceability), and quality management

Processors classify produced kernels as per AFI standard in more than 24 grades, graded by size, shape, and color and packed in 25 or 50 lbs bulk plastic molded pack. Exports are usually done on FOB basis in US$ currency and kernels sold in 20 feet containers. Each container has 3-4 grades and can have 750 cartons of 50 lbs each. The market

pays a premium for full container loads (FCL) of a single grade and discounts if a container has many grades.

By-product processing

One of the biggest advantages of cashew is the opportunity to provide additional revenue for farmers apart from selling RCN. Every kilogram of raw nuts is accompanied with 8-9 kg of cashew apples, which yields a sweet, yet astringent juice. Cashew apple juice requires treatment with starch or gelatin to remove the astringency for local processing or industrial processing set-up. Cashew apples can be used to produce a variety of products such as cashew pulp, cashew apple juice, or cashew liquor, among others. While Brazil and India process and market cashew apples for juice, jam, and other derivative products on an industrial scale, almost all the cashew fruit grown in West Africa remains unprocessed and un-marketed.

Processors also have additional source of income from RCN by processing the raw shells from which kernels are extracted as cashew nut shell liquid, which can serve a variety of industrial purposes. Currently, there are multiple industrial-scale factories in India that extract this oil and sell it in the international market.

On kernel price indications, Cashew Info weekly from Foretell Solutions, a subsidiary of Commodity India, is one of the oldest and most prestigious market information weekly. Essentially all cashew processors in Africa work on this reference price and have their formulation to reach their estimated price expectations. Inventory holding capacity, product quality, food safety compliance, and traceability are some of the factors that play a major role in price negotiations.

4.4 Cashew and climate change

Agriculture is the second largest source of carbon in the atmosphere, which is a leading cause of climate change. When farmers use poor cultivation practices, such as slash and burn agriculture, mono-cropping, and overuse of fertilizers and pesticides, the impacts of climate change are exacerbated. However, the cultivation of cashew trees can be a way for smallholder farmers to adapt to and mitigate the effects of climate change.

Cashew trees are very effective at retaining soil and protecting against soil erosion, particularly in coastal areas. These fast-growing evergreens grow well in sandy areas and are quite tolerant of soil salinity, so they are well adapted to the coastal tropics in places like the Casamance, Senegal. They are also effectively used as windbreaks because of their broad leaves and dense foliage. In parts of sub-Saharan Africa, they are even used for reforestation of degraded lands because they are easy to grow, resistant to drought and pests, and are less likely to be cut for use as firewood or charcoal, thanks to the fact that they generate both food and income for communities over decades.

Furthermore, land planted with tree crops like cashew can remove carbon from the atmosphere and sequester it in the soil, unlike annual crops, such as millet or maize. Scientific research has shown that cashew is an ideal crop for carbon sequestration. Researchers at India's Directorate of Cashew have estimated the carbon storage capacity of cashew trees under high-density planting systems at 32.25 and 59.22 t CO2/ha at the fifth and seventh year of growth, respectively. Compared to the cultivation of input-intensive crops like rice or maize, which emit carbon into the atmosphere, cashew trees actually reduce carbon levels while generating food and income.[11]

[11] Singh, Rao, and Shivashankar, 2013

5 Overview and trends of global cashew sector

In recent years, the cashew market has been driven by increasing demand in middle- and high-income countries. With supply unable to keep pace with this growing demand, prices have skyrocketed, drawing more producers into cashew cultivation, and therefore increasing its overall economic significance in many countries. These changes have drawn the attention of governments, the private sector, and international development actors, thanks to the potential cashew has to transform economies on both a micro and macro level.

5.1 Global kernel demand

In order to understand the ongoing changes in cashew production and processing that are the root of this report, it is first important to understand the driving forces of those changes: global kernel demand. The cashew kernel market is a buyer-driven chain, operated by roasters, packers, distributors, and institutional buyers catering to the ever-evolving consumer need and major concerns of quality, food safety, and traceability. The 2017 global market for cashew was valued at approximately $11.8 billion, with the factory gate market valued at approximately $8 billion.[12] The global cashew market has grown very strongly over the last two decades, achieving a Compound Annual Growth Rate (CAGR) of around six to seven percent in volume over the 1990-2017 period.[13]

Due to the lack of availability of official statistics on kernel consumption, TechnoServe has estimated regional consumption of cashew kernels. Two key assumptions were made to calculate these figures:

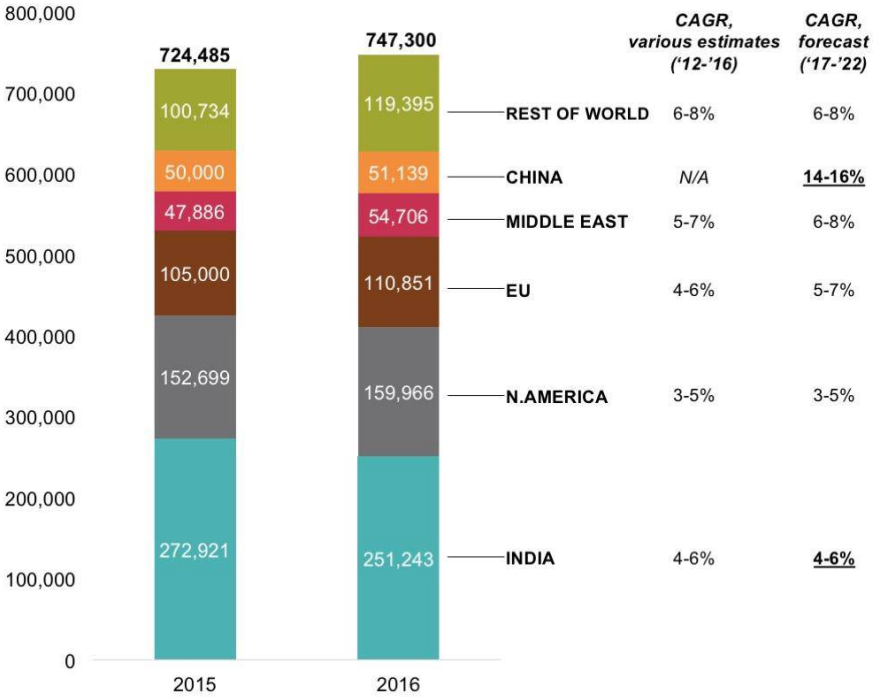
- Values have been calculated based on 2013 consumption share of countries (most recent official source publicly available)
- An average kernel conversion ratio of 23 percent[14]

[12] Calculated based on: 3,434 million MT of RCN production, average yield of ~850 kg/ha, at $15/kg average price in major markets, factory gate at $10/kg

[13] TechnoServe analysis based on multiple sources

[14] This is calculated using the global average outturn of 51 lbs, which produces a 23% kernel yield at final sale, after accounting for weight losses due to humidity, peeling, and grading/sorting. Actual outturn and kernel conversion ratios vary by country.

Exhibit 4: Kernel consumption, MT (2015-2016)[15]



Based on these assumptions, in 2016, about 750,000 MT of kernels were consumed globally. India and North America are the two biggest markets, collectively making up about 55 percent of global consumption. India's strong (and growing) appetite for cashews has led to it consume approximately 38 percent of the world's cashew kernels.[16] Growth in demand in India is attributed to consumer perceptions: cashews are considered a prestigious and healthy food and cashew are used as an ingredient for candies, pastries, confectionary food, sauces, and other recipes. The U.S. and Europe, on the other hand, mainly consume cashews as a salty snack nut, though there too the nut is increasingly used as a plant-based protein.

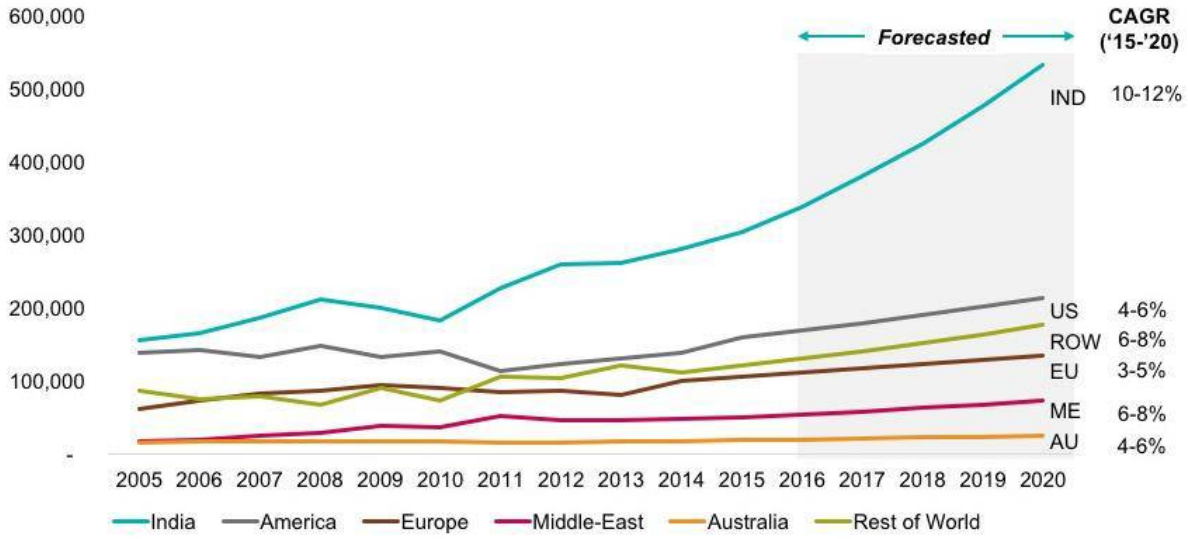
The market is expected to continue to expand in the coming years at a global average of six to eight percent.[17] In the coming 4-5 years, this growth will be driven by India and China, which are expected to grow at CAGR 4-6 percent and 14-16 percent, respectively. Additionally, strong growth is also anticipated from the Middle East and traditional markets. An overview of global consumption from 2005 to 2020 is provided below.

[15] TechnoServe analysis based on multiple sources

[16] Though long-term demand in India is increasing, consumption decreased from 2015 to 2016 (as seen in Exhibit 4) as a result of changes in Indian legislation governing RCN imports (see Section 5.3.).

[17] Kernel consumption figures are approximate values calculated based on multiple primary and secondary sources

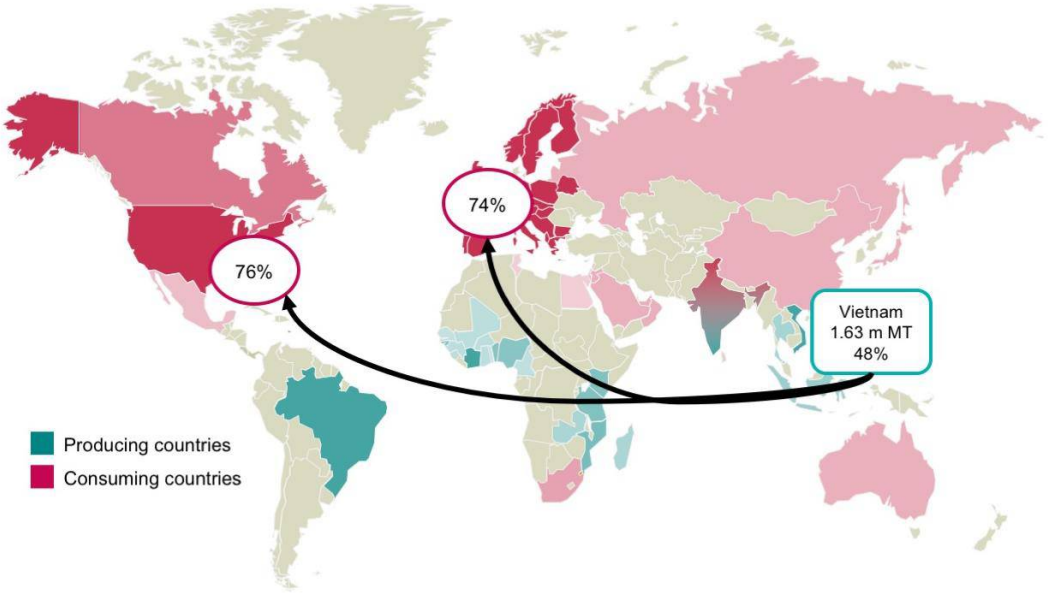
Exhibit 5: Kernel consumption forecast[18]



While India produces its own cashew nuts, all other large consumers rely on imports. Moreover, major importers are largely dependent on a single origin, as seen in Exhibit 6 below. The needs of these major traditional markets, the U.S. and Europe, are predominantly met by Vietnam (approximately 75 percent). This is a big concern for global markets, since this dependency means challenges at the source could cause huge supply and price shocks.

[18] Kernel consumption figures are approximate values calculated based on inputs of multiple stakeholders; 2016-2020 forecasts calculated based on current growth rate of each region

Exhibit 6: Consumer dependence on a single origin, 2017[19]

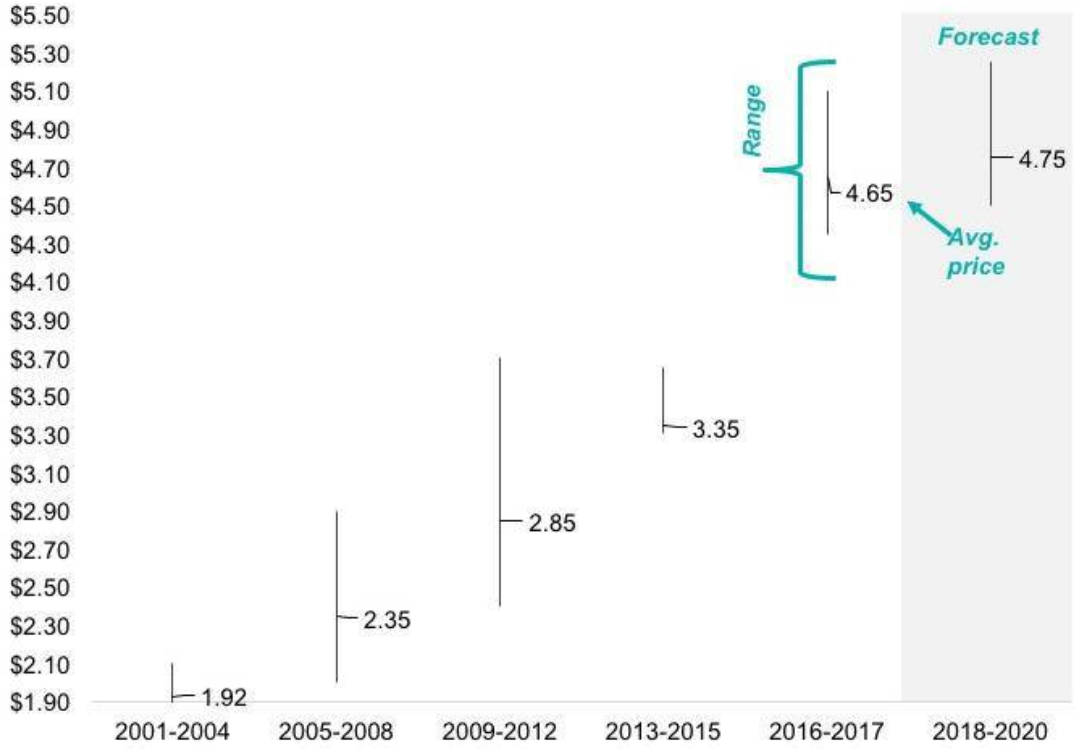


Indeed, this dependence and an ever-increasing demand means there is a tight relationship between demand and supply that makes prices highly sensitive to market changes. Only minor supply disruptions can cause sharp price volatility. Price volatility has been a feature of the cashew market for many years, becoming more pronounced in the recent past. Supply has responded to a certain degree, but is still growing slower than demand: while production increases can be effected relatively easily at the farm-level, it is much more difficult to upgrade logistical and processing capacities. This tight balance of supply and demand will continue to cause volatility, which has an impact on current and future supply. It is difficult for processors to operate efficiently when they cannot reliably forecast revenue and costs. Price volatility coupled with rising processor costs has resulted in 'boom or bust patterns' in cashew agribusinesses.

Overall, cashew kernel prices have followed an upward trend since the early 2000s. As noted, this is primarily due to demand for cashew kernels outstripping global RCN production. On the supply side, with the effects of climate change increasingly pronounced, cashew harvests everywhere have been more variable in recent seasons. For example, the RCN harvest of the northern crop in 2016 was delayed by at least 15 days for almost all countries, sending the kernel prices sky high in the first quarter.

[19] Fitzpatrick, 2017

Exhibit 7: Average global kernel price, 2001-2020 (WW320 US$ per lb.)[20]



As seen in the exhibit above, the overall kernel prices have risen from around $2 per lb. in 2006 to around $4.35 per lb. in 2016, to an exceptional high of $4.95 per lb. in 2017. Price volatility is evident in the wider range of prices in the recent past, with huge aberrations in 2008 and 2011. The outlook for 2018-2020 is forecasted to be stable at current prices or with a small correction on the lower side, with the 'new normal' predicted at around $4.50-4.95 per lb.[21] The key basis for stability at this upper range is rising kernel demand across all geographies. Nevertheless, given the recent price drop in key substitutes like almonds, it is unrealistic for processors to expect extraordinary profits as a result of exceptionally high prices, at least in the near future.

To summarize, going into 2018, there are a few key trends that are expected to shape the kernel market:

[20] TechnoServe analysis based on multiple primary and secondary sources. Note that kernel prices vary according to region.

[21] Forecasts are based on past trends and expert opinions, derived from a brainstorming session that took place at the 2017 World Cashew Convention (WCC) where 12 industry experts from all over the world had a brainstorming session on markets and pricing, which were then reviewed by an additional 570 WCC participants.

The long-term growth prospects for all key markets are positive (i.e. India, North America, and Europe, concentrated between 4-5 countries[22]). Demand in the world's largest market, India, seems to be unsaturated thanks to an expanding middle-class. Vegan, vegetarian, and gluten-free trends, as well as an increasing consumer focus on environmental sustainability, will continue to drive increased consumption in European and American markets. The expansion of the Chinese market, which has great potential to drive the future global cashew market, is rooted in similar forces: rising incomes and a greater appetite for health foods.

Cashew kernel prices have been moving in the current range for the last three years, and this is likely to continue. Unless there is a dramatic change on the supply side, kernel prices are forecasted to remain in their current range. This may create pressure on international kernel buyers to have a reliable, sustainable supply of kernels. Increasing kernel prices could motivate consumers to shift to alternative nuts, though this has not been the case in the past 18 months: kernel prices remain high and quite stable at current levels. Still, cashews are no longer the cheapest nut; almonds, pistachios, and raisin prices have all collapsed in the last 12 to 15 months due to over production driven by high prices in preceding years. This over supply coincided with consumers switching to substitute nuts as a result of high prices in consumption markets. Both almonds and pistachios were more expensive than cashews for several years. These changes in demand and supply upset market equilibriums and have lead to the recent price drops.

Food safety and traceability in coming years will be key concerns for all buyers, as strict regulations are currently being formulated and implemented in Europe and the U.S. Processors need to make rapid investments in order to comply with these standards. Those who fail to do so may end up losing their market. In general, requirements and expectations of buyers are only going to continue to increase; as such, the only surviving processors will be those with a constant eye toward innovation and evolution. U.S. and EU buyers will increasingly focus on procuring from countries that promote sustainable value-chains.

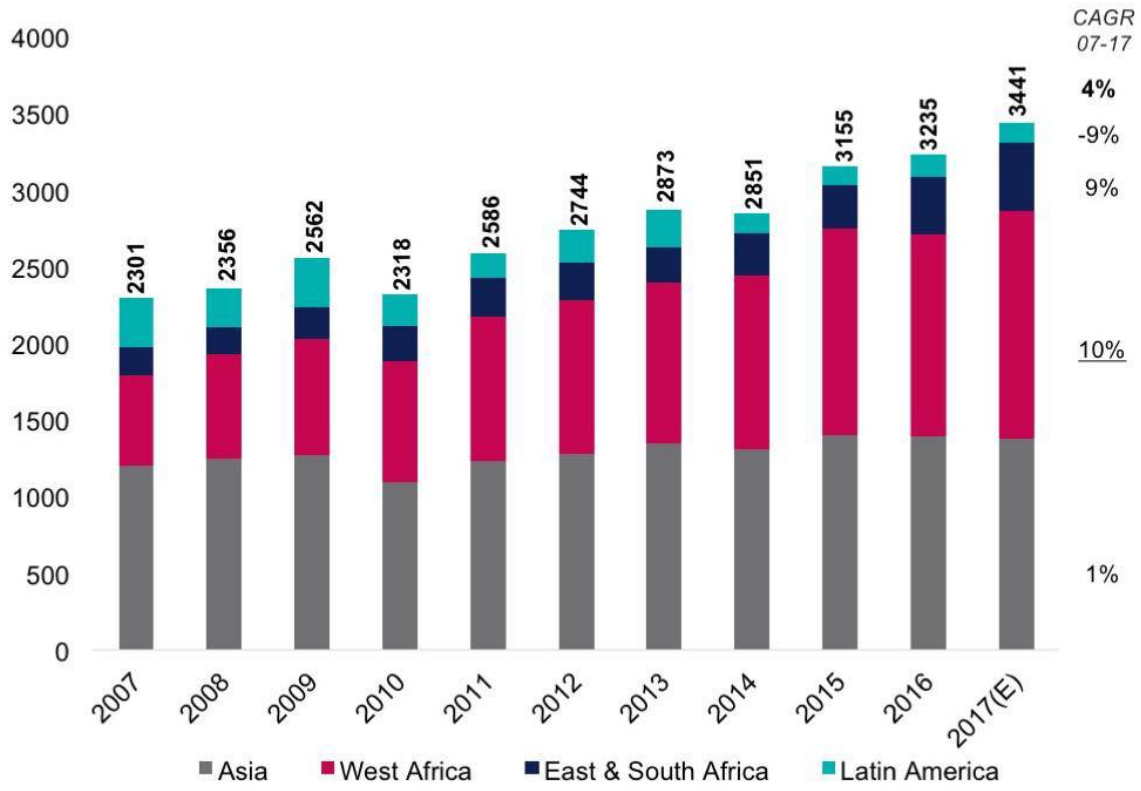
5.2 Production

As rising cashew consumption sustains high prices, there is a clear and strong incentive for production to expand. This represents a huge market opportunity for smallholder farmers across several continents as high kernel prices have translated into high RCN prices. According to interviews, international prices for RCN at the port of Banjul reached $2,400 per MT in 2017, a significant increase over averages of $500-1,000 per MT in prior years. Farm gate prices in West Africa reached as much as CFA 1,100 per kg in July 2017, versus CFA 350 per kg in previous strong years. These prices reflect the growing economic significance of cashew in the region, which only serves to further motivate production increases. In 2017, global RCN production worldwide exceeded 3.4

[22] Notably the Netherlands, the United Kingdom, Germany, and France

million MT—over half of which (56 percent) was grown in Africa. In the last ten years, global production has increased by 46 percent.

Exhibit 8: Global RCN production by geography (thousands, MT) [23]



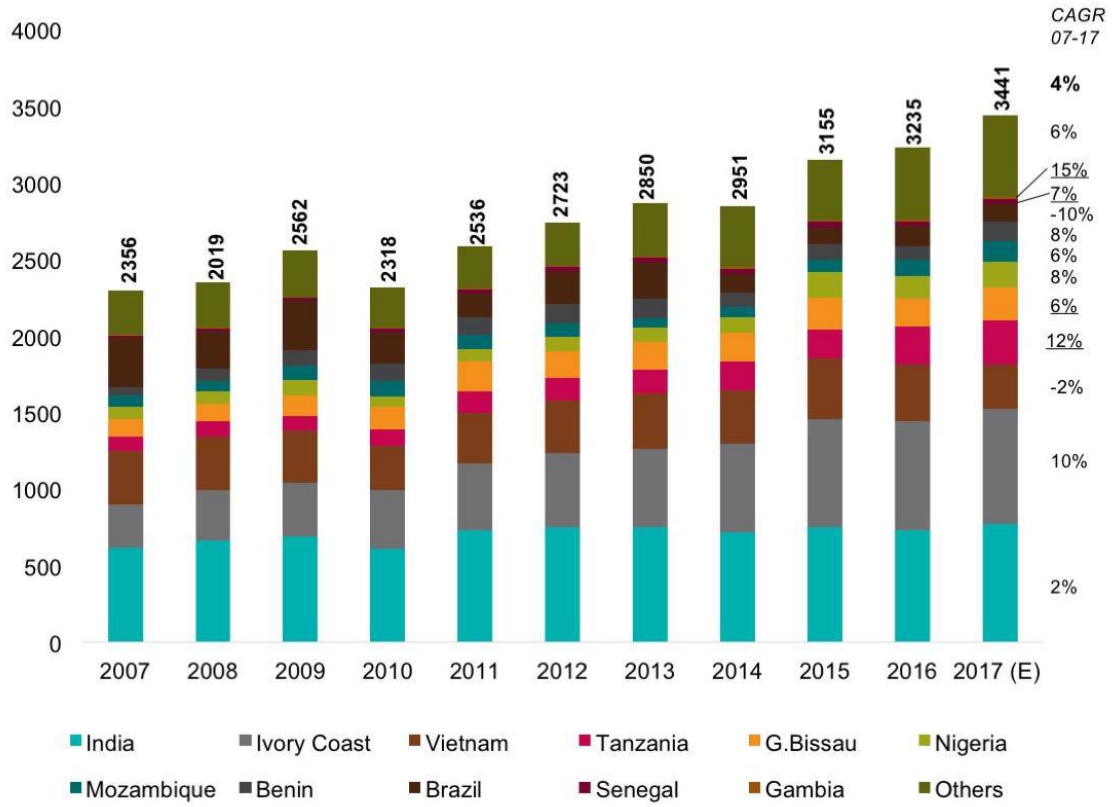
As is presented in the Exhibit above, global RCN production is growing at a stable rate, at approximately five percent CAGR since 2007. West Africa is the fastest growing region, expanding at a staggering 10 percent. In 2017, production in West Africa alone is estimated to have reached nearly 1.5 million MT of RCN, contributing to over 43 percent of the world's supply. Cashew cultivation in West Africa is mainly confined to three geographical areas: the eastern area (Nigeria and Benin), the central area (Côte d'Ivoire, Ghana, Burkina Faso, Mali, and Togo), and the western area (Guinea-Bissau, Senegal, and the Gambia).

Thanks to renewed investments in fighting fungal infections and replanting old acreage, production in East and Southern Africa rebounded from stagnant production in the first half of the decade to achieve high growth rates of about nine percent. Asia, on the other

[23] Ibid.

hand, experienced only modest growth of around one percent, with Vietnam lacking available land to increase production and India investing too little to renew its aging tree population. Latin America has experienced a loss in overall output of nine percent since 2007 due to successive droughts in Brazil (2009, 2011, 2012) that have devastated production, as well as an overall high cost of production.

Exhibit 9: Global RCN production by country (thousands, MT)[24]



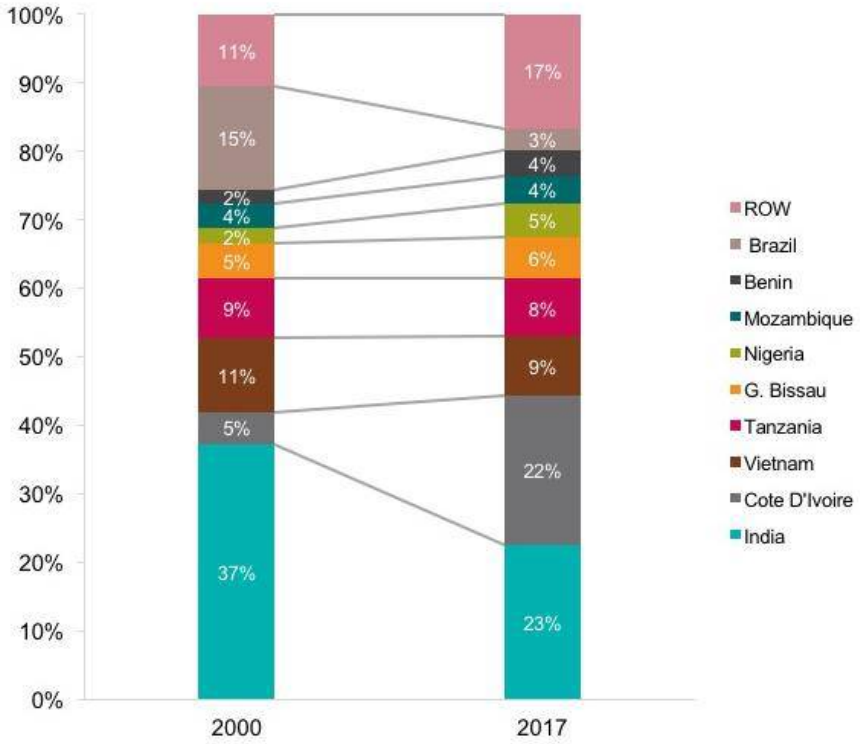
Looking at production trends by country (see Exhibit 9 above), India still occupies the top spot, producing approximately 774,000 MT in 2017, with Côte d'Ivoire maintaining pace in second position at around 750,000 MT. Given its growth trajectory, Côte d'Ivoire will soon be the top producer in the world (up from the fifth largest in 2005). Currently, Tanzania is experiencing the fastest growth in RCN production, with a CAGR of 12 percent. Vietnam, at approximately 300,000 MT in 2017, is down from its ten-year peak of 400,000 MT in 2013, signaling plateauing production. The major challenge to Vietnamese RCN production is competition from other crops and declining productivity.[25]

[24] TechnoServe analysis based on multiple primary and secondary sources.
[25] CashewInfo, N.D.

To overcome this, the Government is focusing on new plantations, improving productivity, and promoting cashew production in neighboring countries (primarily Cambodia, which provided around 112,000 MT, or six to seven percent of Vietnam's import needs in 2017[26]).

Overall, growth prospects in the SeGaBi region look positive as many of its trees are near or at peak, which will result in improving yields and outputs over the coming years. Taking into account cross-border trade to Senegal and Guinea Conakry, Guinea-Bissau's production of 205,000-210,000 MT currently makes it the world's fifth largest producer. Guinea-Bissau's six percent annual growth rate is low in comparison to other African countries, but still higher than the industry average. Senegal, though producing much smaller quantities (about 32,000 MT), secured a seven percent growth rate and is making a consistent effort to sustain increasing production over the near future. With a total production of 12,000 MT at most, cultivation in the Gambia is minimal when compared with global leaders. However, production has been increasing at a very high rate of 15 percent per year, and its strong production economics (see Gambia Value Chain Analysis below) mean there is potential to maintain this fast growth.

Exhibit 10: RCN production share, top producing countries

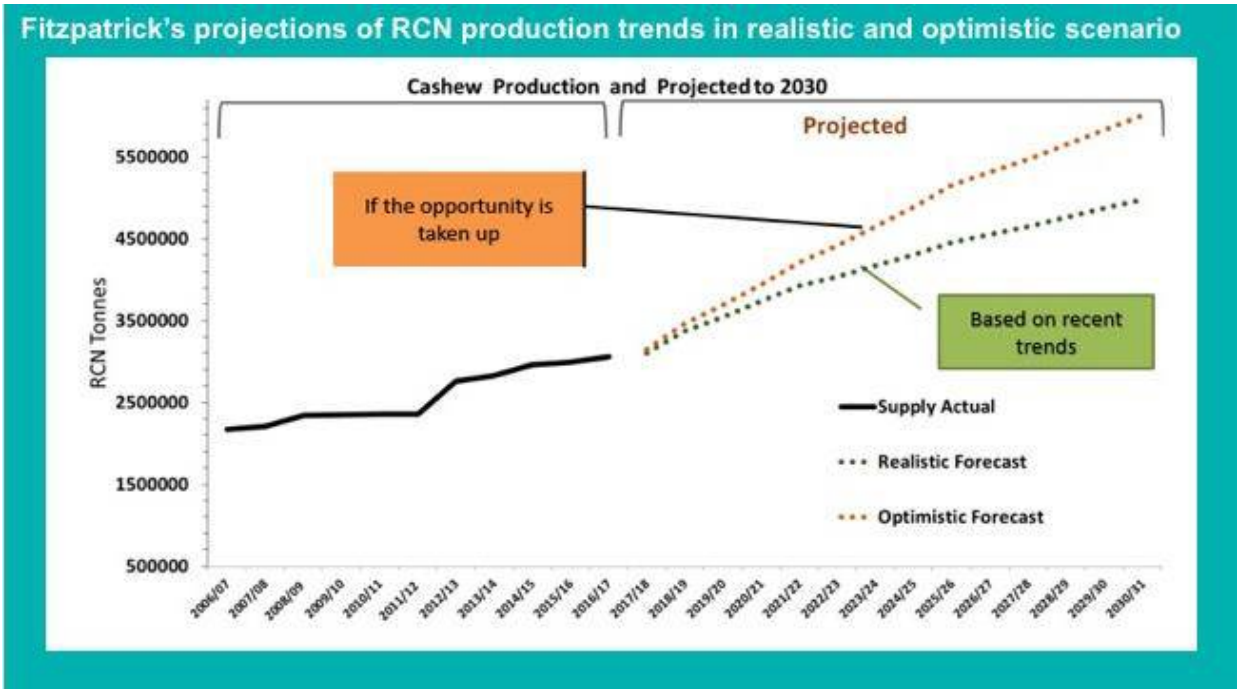


[26] Official statistics provided by VINACAS in June 2017

These national growth trends are also evident in changes in RCN production share amongst the top producers. As seen from the above exhibit, India lost the biggest share in 2017 compared to 2000, closely followed by Brazil who has seen its share fall to three percent of global production in 2017. Côte d'Ivoire has experienced the largest increase in the past 10-15 years, contributing nearly a quarter of the global RCN production in 2017. If current trends continue, Côte d'Ivoire's production share is poised to grow to 33 percent by 2024.[27] Vietnam has roughly maintained their status-quo since 2000, decreasing its share by only a couple percentage points Guinea-Bissau contributes six percent, up only slightly since 2000, while the production of Senegal and the Gambia is too small to figure amongst the top producers.

Aggregating these trends, the exhibit below shows the evolution of global production derived from the actual growth rate from the last ten years, as well as an optimistic forecast based on the implementation of improved agronomic practices that lead to higher yields. In either scenario, the majority of projected future growth will take place in Africa.

Exhibit 11: RCN production trends projections[28]



To summarize, four major supply trends are expected to shape the future of the global cashew industry.

[27] Fitzpatrick, 2014
[28] Fitzpatrick, 2017

West Africa will be the dominant force in RCN production. Given that climatic conditions are well suited for the crop and multiple governments in the region are already focused on increasing production, the region will remain the biggest producer for the near future. Several West African governments place cashew as one of their country's strategic crops and consequently have strategic plans to boost production through better extension as well as new planting.

India will soon lose its position as the largest RCN producer in the world to Côte d'Ivoire. Côte d'Ivoire has grown at a dramatic 10 percent CAGR since 2007 and recorded a peak output of around 750,000 MT in 2017. While official registered production is 680,000 MT, there has been more than 70,000 MT of unofficial RCN outflows from Côte d'Ivoire's borders – a large portion goes to Ghana, with a smaller portion going to Burkina Faso.

India and Vietnam will remain largely reliant on RCN imports from Africa. Over the last decade, demand from Indian and Vietnamese processors has grown faster than domestic RCN production. As a result, processors are increasingly relying on imports to satisfy their processing needs. With growing consumer demand, this trend is most likely to continue through the decade. Vietnam used to follow India on imports but over the last three years, Vietnam's processing business has grown fast and has become the biggest importer of African RCN. Vietnam imported more than one million MT of RCN from Africa in 2017, compared to 627,000 MT in 2015. India, though no longer the number one importer of African RCN, still plays a significant role in this space. In 2017, India imported 723,000 MT of RCN from Africa, compared to 1.1 million MT in 2015.

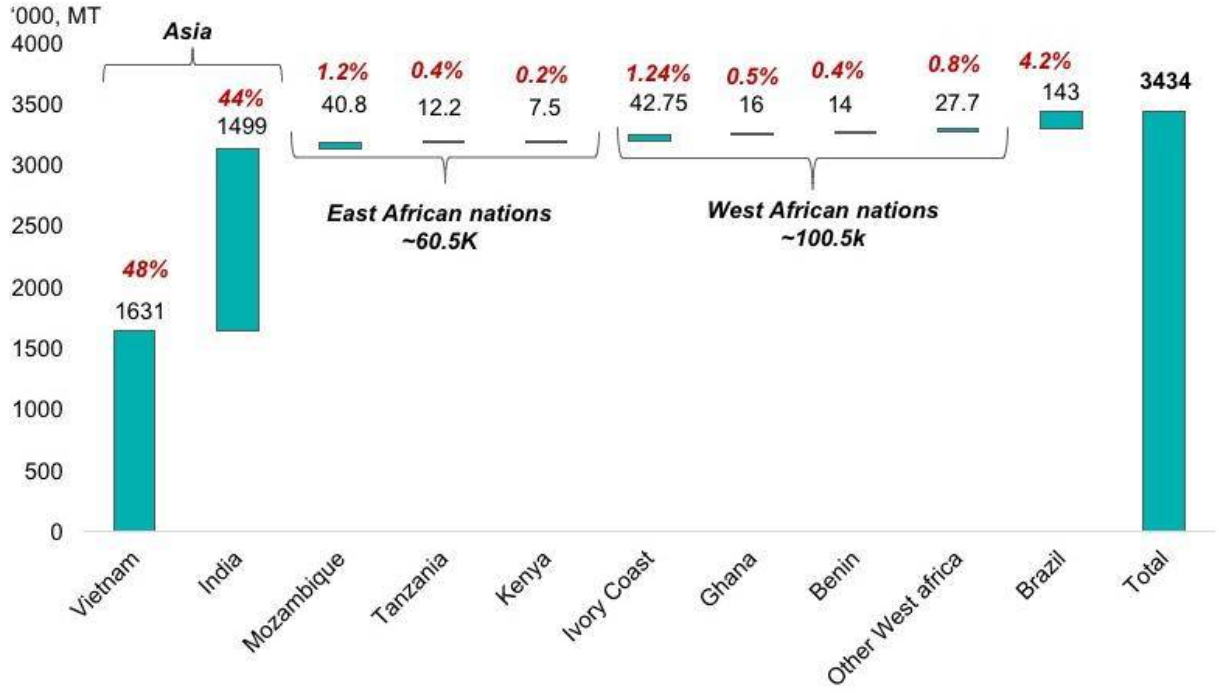
Vietnam will continue to adopt innovative models to secure its supply base. Vietnam has already signed memoranda of understanding with exporter associations in Côte d'Ivoire, Benin, and Nigeria for a fixed supply of RCN every year (a fixed percentage of its total domestic RCN production). Additionally, given its limited available land area to expand cashew production, Vietnam initiated programs in Cambodia and Laos to provide them with funds and technical assistance to develop new cashew plantations. This provokes an interesting question: *will Vietnam eventually include Africa as part of its innovative extension programs?*

5.3 Processing

The processing industry remains largely confined to three countries: India, Vietnam, and Brazil. India's processing history dates back to the mid-1920s, when it started processing kernels to sell on the U.S. market. India remained focused on export markets until the domestic market started to develop in the 1980s and expanded strongly in the 1990s. Vietnam entered the market during the 1990s, when it invested heavily in cashew to support employment in poor, rural areas. Brazil originally started processing cashew during World War II with the objective of extracting cashew nut shell liquid (CNSL) and has since remained a significant processor.

The cashew processing sector has undergone a significant shift in the last decade on both sides of the chain—supply and demand. On the supply side, as noted above, India and Vietnamese RCN production is lagging, necessitating the import of African RCN. The huge dependence of Indian and Vietnamese processors on African farmers and traders has altered market dynamics, including the relative power of each region to determine market trends. RCN traders, in light of growing distance between production and processing, have exploited the opportunity thoroughly, distorting the overall market. This trade, which was dominated by an oligopoly structure of a few large companies based in Singapore, Hong Kong, and the Middle East that ship RCN to India and Vietnam, is changing fast and being replaced by many small and medium traders, and processors themselves who seek to shorten their supply chain. This trend has resulted in a growing geographic gap between production and processing that is unlikely to change in the immediate short term.

Exhibit 12: Quantity of RCN processed in 2017 (thousands, MT)

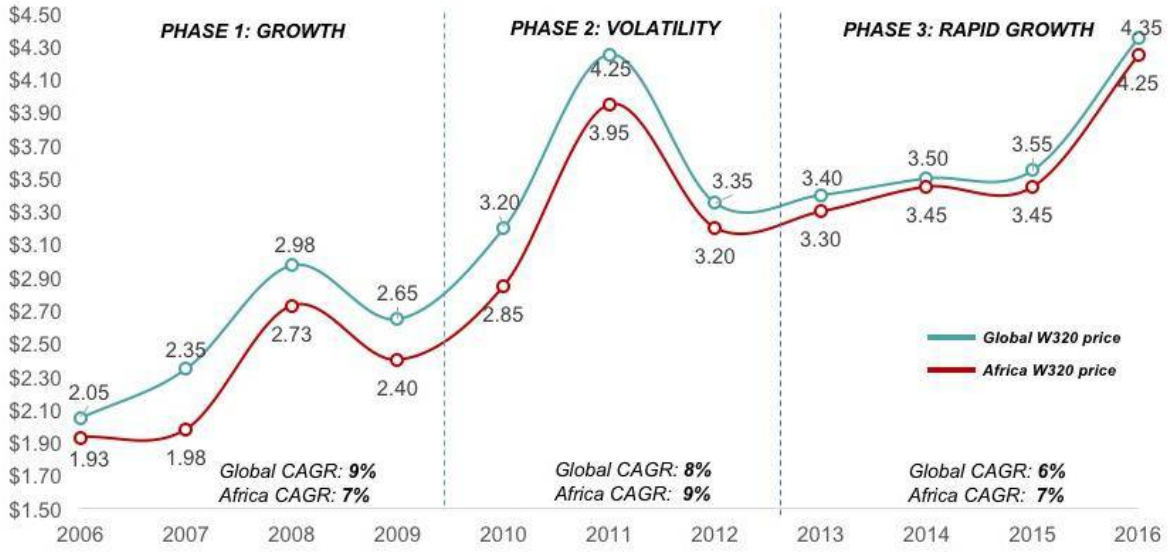


As seen in the above exhibit, the cashew processing industry is very much consolidated into two countries, India and Vietnam, who processed around 3.1 million MT of RCN in 2017, representing around 92 percent of global production. Brazil comes at a distant third, processing an estimated 143,000 MT of RCN in 2017. These three countries together processed more than 96 percent of global supply of RCN. Their dominance in this sector is the result of a few key factors: extensive experience in processing; decades of continuous governmental support, such as investment matching, export incentives,

import duties, and subsidized credit schemes; cheap labor and in-house technical expertise; and, limited global competition. With kernel import duties at around 45 percent, the Indian domestic kernel market is highly protected by the government. This provides a key advantage, and along with export subsidies, it allows processors to sell at domestic prices 15 to 18 percent higher than the international market. Another factor of success for Indian processors is the huge domestic market for both broken and whole kernels, whereas all other major markets primarily consume only whole kernels. Vietnamese growth has been driven by similar levels of government support, with policies for technology development as one of their main competitive advantages.

Processing contributions from Eastern, Southern, and West African nations are in infant stages, but with sufficient effort and appropriate support from their respective governments, these regions could soon grow to be a global force. To date, Mozambique is already a good example of processing success on the African continent. There, the government has supported the cashew industry by reinvesting 80 percent of revenue from RCN export taxes (18 percent) to support farmers, with the remaining 20 percent used to support processors. Mozambican processors also have first right of access to RCN sales – exporters are not allowed to export nuts until processors have indicated they have purchased their full supply for the season.

Exhibit 13: Global and African average kernel prices (WW320 US$ per pound)



Historically, kernel buyers were unwilling to pay international prices to African processors due to their inability to provide larger quantities and challenges in delivering kernels reliably. Since at least 2012, however, these problems have effectively disappeared and African processors have been able to sell at more competitive prices as compared to previous years. The global-African kernel price gap is decreasing and should soon be

negligible. Trends in traceability and food safety compliance, which are driven by U.S. and European preferences and regulations, also influence this trend. As long as India and Vietnam continue to process imported RCN, they will never be able to comply with traceability rules. African processing does not face this challenge, and actors there are also responding well to food safety compliance issues.

Going into 2017/2018 season, a few key trends, outlined below, will shape the processing market.

Vietnam will remain the largest exporter of kernels. With India's domestic market showing no saturation for consumption, its exports will further decline as processors and buyers prefer to focus on the domestic sales, which provides a price premium of 15-18 percent.[29] Though India is catching up, innovative technology that has been adapted and launched in Vietnam has allowed processors there to keep costs low. Vietnam's growth will depend on its ability to maintain this trend as well as manage competition from Brazil and Africa. Brazil has not been able to consistently increase its processing volume.

China could grow to become a major new player. Although cashew processing has not yet taken off, domestic Chinese demand is growing steadily and is currently served by imports from Vietnam. This enhances Vietnam's liquidity, strengthening their negotiating power with buyers in Western markets.

India will further lose competitiveness in processing due to new legislation introduced in 2016. This legislation increased the import duty on RCN imports, which can be rebated through exports; this policy may be effectively neutral to export-scale processors but it hurts small-scale processors who cater to the domestic market. This legislation also increases the competitiveness of Vietnamese processors whose costs are already $100-$120 cheaper than those in India for 1 MT of RCN. The impact of this policy has already been apparent in 2017, as Vietnam in 2017 imported more than 1.1 million MT of RCN, compared to 768,000 MT in 2015. However, Indian politics are flexible and this may be changed at any time if they feel it is causing a loss in market share.

Processing is becoming a 'tightrope walking' business, and margins will continue to dwindle. On average, 2017 RCN prices were about 30 percent higher than in 2016 and 35 percent higher than in 2015. This is due to the increasing global demand for kernels, as well as the intense global competition in the RCN market. India and Vietnam both have unutilized processing capacity due to RCN shortages. At the same time, kernel prices cannot sustain high increases, since other nut prices are falling. This means the margin between RCN prices and kernel prices is ever smaller. Once additional costs are included, it becomes clear that these trends put strong pressure on overall processor margins. African processing is the most impacted, as its nascent industry confronts higher costs as a result of dramatic price volatility, limited policy support, limited experience, and a high perception of risk due to RCN and kernel price parity. Working capital loans are

[29] TechnoServe analysis based on multiple sources

only becoming more difficult to obtain due to stringent banking rules in India and high rates in Africa. The global cashew industry is moving towards standardization of processes; effectively adapting operations to policy and regulation changes – domestic or international – that impact a given processor's competitiveness will play a major role.

The ability to comply with food safety requirements and traceability will become increasingly key to success. With more and more buyers concerned about traceability and Western governments introducing strict food compliance laws, processor success will be significantly affected by their adherence to these laws. The increasingly dispersed international RCN trade is a challenge to this trend. The competitive and often informal nature of trade mean there is little room for the added cost and effort of implementing traceability, which requires documentation detailing the movement of RCN supply from production to processing. As traceability becomes increasingly important for consumers, the historical processing centers in Vietnam and India will struggle to comply. On the other hand, implementing traceability processes is practically and economically viable for processing models based on *local* sourcing, i.e. those being promoted in Africa. In this way, traceability efforts also go hand-in-hand with efforts to reduce the cashew carbon footprint: less movement of supply means reduced carbon emissions as well as easier traceability. In short, these dual forces – traceability and reduced carbon emissions – favor African processing over present models.

More traditional markets in support of traceable and sustainable supply are emerging. Processing at supply origin will become ever more competitive, as in the medium to long term this is the only sustainable business model that leads to all efficiencies—economic, social, and environmental. Investors are active in West Africa and we may see significant investments made in cashew processing at a very high rate. Thanks to recent reforms and strong government support for domestic cashew processing, Côte d'Ivoire and Benin are among the best choices for investors.

5.4 Summary and outlook

U.S. and European consumption preferences and trends, including traceability, food safety, and environmental and social concerns will continue to influence the future of the global cashew market. For these large consuming countries, there is an interest in strategic partnerships to secure supply. Potential investments could include consolidation of roasting and processing sections, with some social investments through corporate social responsibility (CSR).

To date, EU and U.S. markets have relied heavily on kernel imports from Vietnam, which in turn relies heavily on RCN imports from African countries. This model is neither compatible with consumption trends nor wise: dependence on a single origin is economically risky. RCN trading also reduces quality and is susceptible to speculation, manipulation, and policy wars. Vietnam faces other challenges as well. The world's leading kernel exporter is currently experiencing an RCN supply deficit, with falling production. As a result, Vietnam's dependence on RCN imports is likely to continue. In

terms of exports, one of their key challenges is the high cost and logistical challenge of an extremely long distance to end markets. There is a risk of compromised food safety compliance and unacceptable labor practices as well.

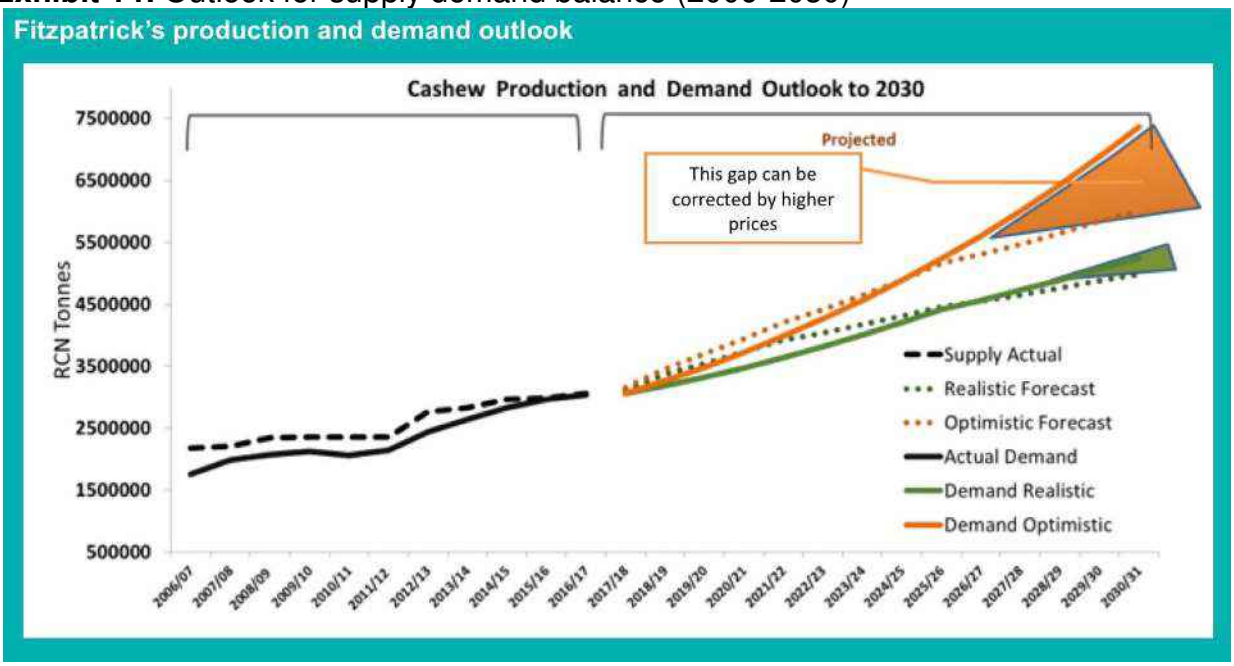
However, there are still many forces that will continue to support Vietnam's global dominance. The government is currently making investments to secure supply (Cambodia and Laos). On the processing side, Vietnam has made significant technological advancements in the last few years all along the processing line, from steaming and de-shelling to peeling and grading to packaging. Such advancements have both improved quality and cut costs (through automation). These investments in processing have been mostly for large plants. Potential investment interests also include international joint ventures and investments to address food safety concerns, improve yields and efficiency, and inputs. Vietnamese access to the Chinese market will also continue to be a major source of support for the competitiveness of its processing sector in at least the medium term.

In Brazil, production has fallen, as the country has experienced reduced processing capacity through higher operating costs and environmental challenges. This has motivated a state interest in research for improved varieties.

India will remain inward looking for the foreseeable future. India is experiencing fast domestic consumption growth, which is outpacing supply. There, organized processing has declined (85 factories closed in 2016) as Vietnamese processors have out-competed Indians on the international market. Like the Vietnamese, traceability and food safety compliance are challenges. This context has favored small-scale processors who have benefited from recent investment and are able to supply a quality kernel to local markets at relatively high prices. Otherwise, technology adaptation is in its initial stage, and there is much room for increased efficiency as a result. There is also Government interest in extension for production support.

In Africa, there is a both a large production opportunity – to meet local and foreign processors' needs - and a large processing opportunity – to satisfy U.S. and European consumption markets using traceable, clean, responsibly sourced and processed kernels with a lower carbon footprint than those in India and Vietnam. Together, this culminates a large value addition opportunity.

Exhibit 14: Outlook for supply demand balance (2006-2030)[30]



The above exhibit presents an estimation of the future demand and supply gap, represented by the orange triangle. Though future higher kernel prices could discourage demand growth and narrow this gap, higher production will remain necessary to close it. Africa can be the key to raising production to meet growing demand, though planting more cashew trees is not enough. African cashew producing countries should invest in applying good agronomic practices and providing better extension and research to improve yields alongside expanded cultivation. Recently, more governments have shown interest in investing in extension, production support, favorable policies for processing, research, and sector organization.

Additional processing capacity is also a huge opportunity for Africa, as processing locally would add approximately 25 to 30 percent value to cashew gross domestic product[31], while helping to meet the growing global demand for kernels. However, the future is challenged by high costs, poor financial services, limited awareness of market needs, and political instability in some countries. In West Africa, there is interest in large investments in large- and export-scale processing and local investments in small and medium scale processing. In East Africa, investment projects to-date have largely been unfulfilled, including: consolidation in Mozambique, where mainly foreign investors have been funding; and inputs in Tanzania, where Tanzanian policy has been difficult to implement.

[30] Fitzpatrick, 2017

[31] The average FOB RCN exported price over the last three years is estimated at approximately $1,600/MT. If processed nut prices are around $700 more (assuming African processing gains its efficiencies, right yield realization, use of shell etc), that would yield a 44 percent increase in value.

Technology reduces processing costs, eases start-up investments, and mitigates operational risks. However, technology also demands higher capital investment.

6 Regional overview

While each country in the SeGaBi region has its own unique prevailing conditions, opportunities, and challenges for the cashew value chain, this section highlights some of the overall characteristics.

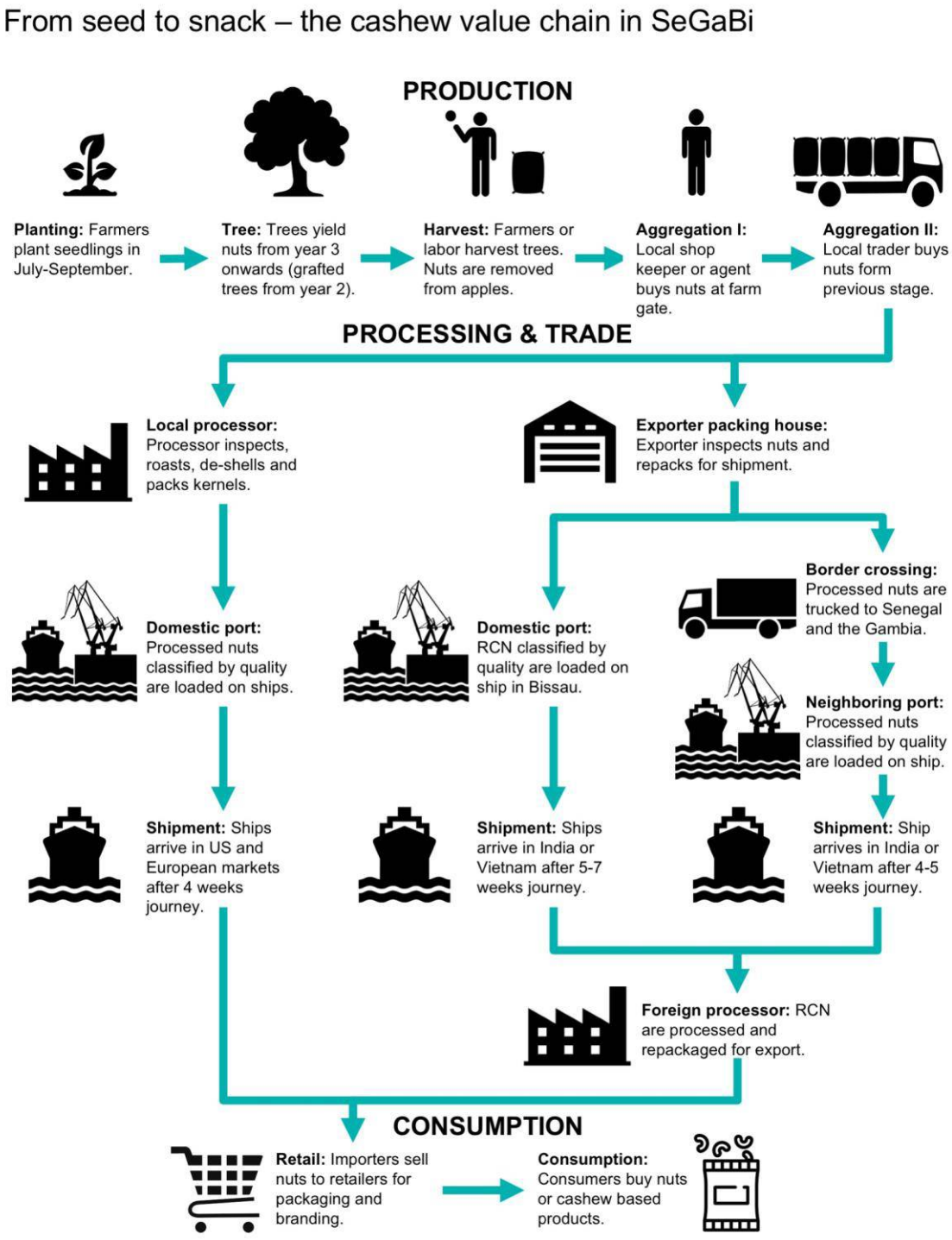
Table 1: Regional cashew sector indicators[32]

Characteristic	Senegal	Gambia	Guinea-Bissau	Total/Avg
Average KOR (lbs)	50-52	50-52	52-54	**51-53**
Average yield (kg/ha)	300-400	350-450	250-350	**250-450**
Average tree age (years)	15	10	25	**20**
Hectares under cultivation[33]	170,000	28,000	850,000	**1,048,000**
Production (MT, 2017 E)	38,700	12,000	210,000	**260,700**
Processing capacity (MT of RCN, 2017 E)	5,400	1,500	28,000	**34,900**
Processing utilization (MT of RCN, 2017 E)	500	100	4,000	**4,600**

Combined RCN production of the SeGaBi region is around 260,000 MT per annum, with an average minimum outturn quality of 52 lbs – higher than the global average of 51 lbs. Over 80 percent of SeGaBi RCN comes from Guinea-Bissau. SeGaBi has close geographical borders and all three countries are closely linked and connected when it comes to RCN production and trade. The overwhelming majority of RCN production (98%) is exported to foreign processor, as the RCN processing industries in all three countries remain underdeveloped. In this way, the RCN trade heavily dominates the overall regional value-chain.

[32] TechnosServe analysis and various primary and secondary sources, as indicated in Sections 7-9
[33] Productive and un-productive

Exhibit 15: SeGaBi regional cashew value chain



Note: The graphic above is based on Guinea-Bissau.

6.1 Regional RCN trade

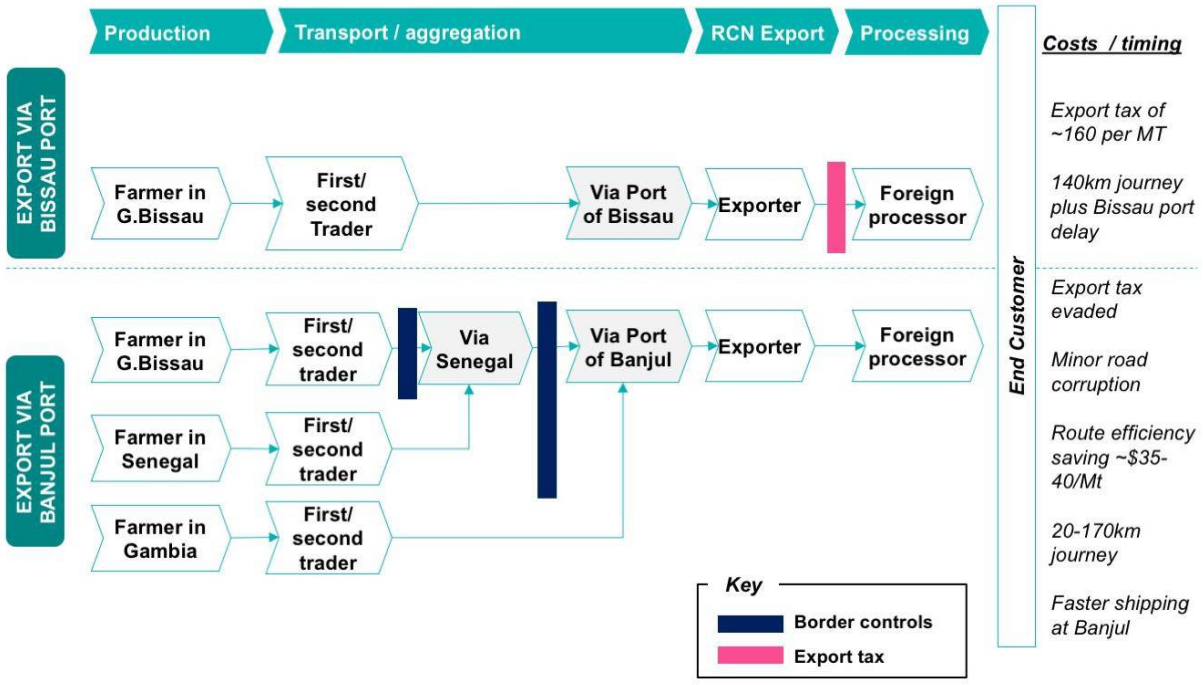
Most regional production is exported through the port of Bissau, secondarily through the port of Banjul, and lastly, a very small minority through the port of Dakar. Export through Bissau should be cheaper and more efficient than taking product to the port of Banjul, which requires passage across two borders and payment of various bribes along the way. However, Guinea-Bissau is challenged by weak infrastructure (notably the port) and detrimental policies. Its RCN export tax is ultimately a cost that is passed on to producers via lower farm gate prices. Senegal and the Gambia, on the other hand, do not have such taxes. These differing sector export policies cause strong cross-border price differentials that encourage trading across land borders.

On the other hand, the port of Banjul is recognized as one of the safest and most efficient in West Africa. Compared to the port of Bissau, an exporter saves 4-5 weeks when he/she ships through the port of Banjul during the cashew campaign. This significant reduction in time and the amount it saves in resources leads to lower risks as well as better trade dynamics. In this way, Gambian RCN exports are always greater than domestic production.

Indeed, regional traders handling Cacheu and Oio RCN (which accounts for almost 50 percent of Guinea-Bissau's production) see export through the port of Banjul as a more profitable route for themselves and the farmers they buy from. When taking this route, most nuts pass through Ziguinchor, Senegal, where RCN is coordinated and consolidated before being channeled to Gambia's port of Banjul, only 156km away. The majority of cashew traders and exporters in Senegal and the Gambia have a presence in Ziguinchor, which is now a main trading hub for the regional cashew value chain.

Since 2015, however, cross-border trading has decreased. The first factor that has impacted and ultimately reduced cross-border volumes is Guinea-Bissau's 2015 export reform. The reform prohibits cross-border trade by land, in order to safeguard revenue loss from transactions over land borders: the Government does not have the means to collect export taxes on its vast and porous land borders. The second factor was the 2016 Gambian political crisis. While this was a detriment to trade through Banjul, it represented the very first time when significant volumes (15,000 MT of RCN) were exported from Senegal's port of Dakar. This is extremely high for the port of Dakar, which usually exports around 2,000 MT. At present, trade volumes through the Gambia are increasing again, thanks to increasing production in the Casamance. The drastically reduced overflows from Guinea-Bissau, however, are expected to remain as such for at least the near future.

Exhibit 16: SeGaBi regional cashew supply chain routes



It is important to note that cross border trade has a significant impact on SeGaBi farmers' incomes. For example, choosing to export from Gambia adds $175-200 per MT in value, a big portion of which goes to farmers.[34] This added value is due to costs savings from not paying RCN export taxes (cross border trade is an illegal trade) and route and port efficiencies.

In an ideal scenario, without RCN export duties in any of the SeGaBi countries, differential economic gains between these two routes would not be significant. Without the tax, exporting through Gambia would only save around $35-40 per MT of RCN exported, but it would drastically reduce the risks and possible value loss associated with delays. The latter benefit is more advantageous for a trader. In reality, Guinea-Bissau has duties on RCN exports and will continue to mandate these as the duties account for an important part of the country's national budget. Comparatively, Senegal and the Gambia do not have duties and should not mandate them anytime soon as each country has a long way forward to build their production strengths to reach their full potential.

Within the current system, Senegalese traders will always be more competitive than those in Guinea-Bissau, as they can offer a premium price of CFA 45,000-75,000 per MT of RCN at farm gate to farmers in northern Guinea-Bissau. This represents approximately

[34] TechnoServe analysis based on multiple sources

7-11 percent additional income, but it is only possible through smuggling. Still, given this premium, along with tough competition and an inability to comprehensively control land borders, it is likely that these illegal outflows will continue to grow.

RCN trade: step-by-step

While the RCN trade varies slightly by country, a general process can be outlined. The RCN trade begins with farm gate sales and proceeds to export through either the port of Bissau, Banjul, or Dakar by way of several intermediaries, of which there are variations in the number and type of actors.

The entire raw nut marketing chain is activated by pre-financing provided by the exporters. Without a buyer, there is no industry. Almost all of this money comes from large Indian nut importing companies that are either self-financed or have Indian bank financing. This pre-financing is distributed by exporters to their wholesaler RCN suppliers (larger traders), who in turn pre-finance their suppliers (smaller traders). Even so, the industry operates in a very informal way, with a predominance of cash payments. This is even the case among exporters whose accounting instruments, despite their corporate status, are sometimes very weak. This makes it challenging from an access to finance perspective. RCN procurement from farm to port typically has two to three stages.

The first stage represents the very first contact with farmers. First stage traders are either traders based in the villages or itinerant operators, often Mauritanians, but also locals, who buy small lots from producers that are then aggregated to constitute larger lots, which are then resold to other intermediaries. These traders often have small village shops that sell farmers essential goods and that also serve as a temporary storage place for the aggregated RCN. It is also common that they are or were RCN producers. Their storage capacity is normally limited to 8-10 MT or less. Weighing takes place at the farm, when traders bring scales to weigh the RCN that will ultimately be exported. As local residents, their familiarity with the locality allows them to take advantage of farmer vulnerabilities to their own benefit. These traders are, therefore, able to buy at relatively low prices at the beginning of the cashew harvest, which is also the lean season when producers are desperate for cash to buy food. They also sometimes barter bags of rice for RCN, but the quality of the rice in question is often described as poor. As frequently noted during interviews, from one end of the industry to the other, “no one is ever completely innocent.”

First-stage traders act on behalf of and are pre-financed by the second stage of the RCN trade, wholesalers or consolidators. Wholesalers are typically located in secondary cities or regional capitals. Once delivered by the first-stage traders, wholesalers then transport the RCN load either to exporters in Bissau/Banjul/Dakar (the majority of cases) or to local processors (the minority). In some cases, there is a third level of traders before delivery to the exporters. Conversely, there are also cases of a shortened supply chain, for example, Indian importers or industrial processors who buy RCN directly in the countryside.

Transit warehousing typically consists of old buildings used for rice, peanuts, and other crops. In some rare cases, cooperatives, such as OPRO in Guinea-Bissau, have their own storage facility, thanks to donor or NGO interventions. The Canadian-funded *Programme d'Appui au Développement Economique de la Casamance* (PADEC) built five facilities in the Casamance.[35] Other (formal and informal) cooperatives and producers store their nuts in their living quarters or in school rooms, pending collective sale. Storage warehouses in rural areas are currently limited, but remain critical to limit post-harvest losses: this is a key need for the industry. Existing facilities - especially repurposed storage sites - are characterized by improper storage conditions: lack of proper ventilation and protection from water damage mean that even nuts that have been properly dried are liable to fall victim to rot or germination.

Certain quality control checks, including, but not limited to, moisture content measurements, nut count, foreign matter inspection, and phytosanitary inspection, are done at the warehouse and at export. This control is done by buyer representatives and quality control companies, such as *Société Générale de Surveillance* (SGS) and *Audit, Contrôle, et Expertise* (ACE). Both are active at this stage to ensure the quality and safety of RCN stocks.

After this storage, exporters load the containers of raw nuts for export. Weighing then takes place at the port, on the weighbridge of the port where weighting receipts for the quantities exported are produced and serve as the basis for the application of any levies and taxes (note that this is more so an expense in Guinea-Bissau than in Senegal and the Gambia). This weighing is done in the presence of interested public and private actors, and under their attentive oversight. These actors might include:

- Exporters;
- Customs services;
- Officials of the Ministry of Commerce;
- Officials of the Chamber of Commerce
- Insurers;
- Representatives of foreign buyers; and,
- In Guinea-Bissau, officials of the CNC (National Council of Shippers) and The National Cashew Agency (ANCA).

After the payment of levies and taxes and receipt of the certificate of origin, the nuts are authorized for embarkation.

[35] Three in Kolda, one in Ziguinchor, and one in Sedhiou (PADEC, 2017)

6.2 Regional policies and collaboration

There is currently almost no regional collaboration on cashew sector policies, crop cultivation, or RCN trading. However, there is tremendous potential for all three countries to gain from collaboration on the following:

- Sharing best practices on cashew cultivation
- Research and development, as regional opportunities and challenges are similar
- Free movements of goods (land border tax collection, if exemptions cannot be provided)
- Regional value addition opportunities, for example by creating mutually beneficially arrangements between Senegalese processors and Bissau-Guinean producers
- Market information systems

Only Guinea-Bissau has some specific sector policies, though most of these are related to export tax and sector organization. Currently, neither Senegal nor the Gambia have any cashew specific sector policies.

Research

Recently there has been increased collaboration between African countries on cashew research, with the help of technical and financial partners such as CORAF/WECARD, FIRCA, PSAC, and ComCashew and the participation of 12 research institutions in Africa, and the Cotton and Cashew Council of Côte d'Ivoire. Under this initiative, the Consultative International Council of Cashew (CICC) organized a Colloquium for Scientific Exchange on Cashew (CIESA) in September 2017 in Abidjan.[36] The primary focus of CIESA 2017 was to discuss scientific and technological achievements on agro-ecological intensification of cashew production and processing in Africa. Other topics discussed included:

- Genetic resource management and varietal improvement
- Agronomy
- Crop protection (pest and disease management)
- Biotechnology
- Processing, value addition and equipment
- Innovations and technology transfer

To strengthen knowledge sharing and dissemination of results among researchers, a collaborative platform was launched during the colloquium. The platform aims to improve production, processing, and value addition in the various member countries of the *Reseau de Recherche et Development sur l'Anacarde en Afrique* (REDDA), an R&D network.

[36] The conference schedule can be found here: https://redaa.org/cesag-2017/. Research produced for the conference should be published in a special issue of *Tropicultura* (http://www.tropicultura.org/eng/home/) in early 2018.

REDDA member countries include Burkina Faso, Benin, Côte d'Ivoire, Ghana, and Senegal.

Seedlings and nurseries

The SeGaBi region produces some of the best quality RCN, however yields per hectare are limited. Plant the wrong varieties and not applying best agriculture practices are major contributing factors to these lower yields. SeGaBi has various varieties and thousands of high-yielding, disease resistant trees, that can serve as mother trees to provide grafts for multiplication but the region has not yet been able to identify mother trees.

Improved yields are guaranteed when planting is done using grafted seedlings. However, lack of nurseries and production of high-yielding grafted seedling is a huge constraint for the SeGaBi region. Each of the three countries require grafted seedlings for new planting or rehabilitation of existing old trees, or both. Guinea-Bissau's immediate need is for replacement of old orchards and the planting of new areas. Senegal and Gambia should instead focus on expansion in both existing and new areas. Seedlings are therefore a basic need for the region, but none of the countries have any tangible ongoing or planned initiatives to mass produce high-yielding and disease-resistant varieties through grafting techniques.

Technically, it is not difficult to design a good plan to properly address this issue. Many countries have already done this with success in West Africa and their experience can be replicated with only minimal adaptations. Best practices in seed selection from existing production is a straightforward and simple process if implementing teams are well aware of the technical curriculum. The few main prerequisites on selection criteria for right grating material (mother trees) include:

- Quality of the nut (size, and outturn – KOR);
- The productivity of the parent tree in terms of kg per year of nuts;
- The health of the parent tree, particularly its resistance to diseases, pests, and insects;
- The shape of the parent tree (branching, crown).

It takes 2-3 years of careful follow-up to identify mother trees. However, new plants from this technique behave in the same way as the source tree only if planted within the same geography and under similar climatic conditions. Once grafting material is identified, top working and canopy substitution will allow farmers to rejuvenate unproductive trees without requiring full replacement.

6.3 Access to finance

There is currently a huge potential to increase the role of finance in the regional cashew sector. Without adequate financial resources, producers, processors and traders find it

difficult to have the necessary means to sustain and grow their activities. The current financial services in the region serve only low risk ventures, which have either a proven track record – audited balance sheets and profit statements, strong management, prior experience with banks - or sufficient collateral – often 150 percent of loan value - to meet financing requirements. Like other parts of Africa, SeGaBi's financial sector has little engagement with the cashew industry. Very few cashew stakeholders have access to credit, with the exception of some, mostly larger, traders. Banks have limited interest in the sector as they are not well aware of the sector's potential, opportunity, and risks.

In Senegal and the Gambia, cashew is a relatively new crop, cultivated in a relatively remote geography, which comes with its own challenges as the remote areas are further removed from financial institutions. Guinea-Bissau's financial sector has already been tainted by failures of some pioneer financing deals, which has made financial institutions retract to only doing business within their comfort zone.

In recent years, some efforts have been made to make financial institutions more aware of the opportunity offered by the cashew industry. However, the efforts were not substantial enough to close the financing gaps. Some African peer countries have made some significant progress in training bankers and promoting loans through technical assistance programs as a risk mitigating instrument. The experiences in Mozambique, Benin, and Côte d'Ivoire is worth drawing from for replication in the SeGaBI region.

Access to finance for small and medium enterprises (SMEs) remains a challenge, with an estimated 90 percent of bank credit applications being denied because of insufficient collateral. In any cashew value addition investment initiative, facility and equipment costs are always less than the working capital need, which requires additional collateral to support the loan amount adequately.

Currently, SeGaBi's cashew sector is constrained by a low level of access to formal financial services, with low population densities, poor infrastructure, and limited communications contributing to a lack of supply. Even where such services are available, low-income individuals and small and medium businesses may have difficulty meeting eligibility criteria such as strict documentation requirements or the ability to provide collateral. Those able to meet such demands may find that they are still excluded from formal financial services by cost barriers, in the form of high transaction fees or substantial minimum requirements for savings balances or loan amounts. Lowering these barriers to access and offering suitable financial products can allow cashew farmers and small businesses to maximize the leverage of their savings or earnings for increased productivity, contributing to higher incomes.

6.3.1 Demand for finance

The profile of bankable projects submitted for funding suffers from multiple shortcomings, which compromise their eligibility. However, there is a variety of potential opportunities

for finance to play a role throughout the cashew value chain. TechnoServe estimates the demand for finance to total around US$135m over the next six years, as seen in Table 2. Financing is not estimated for traders and producers in 2018 as it is assumed that some time is needed to establish relationships and sensitize these groups.

Table 2: Estimated regional financing need, 2019-2023 (US$, thousands)[37]

	2018	2019	2020	2021	2022	2023
Processing	$5,374	$12,938	$18,886	$22,850	$27,831	$34,491
Trading	$-	$1,104	$1,766	$1,987	$2,208	$2,355
Production	$-	$270	$390	$540	$750	$900
TOTAL	**$5,374**	**$14,312**	**$21,043**	**$25,377**	**$30,789**	**$37,746**

Working capital and capex for producers and producer groups. Producers use their own savings and their own physical resources, and are typically not yet educated enough to identify the need for financing to expand or improve production. However, as income generated by cashew production continues to increase for farmers, more farmers will begin to think about further investment and expansion and the access to finance gap will become even larger.

Although cashew farmers do not face intensive annual input costs for their trees, they need finance to implement best agronomic practices and other needs, including:

- Planting costs (e.g. grafted seedlings)
- Labor and tool costs for farm maintenance
- Pest and disease control (e.g. spraying equipment)
- Harvesting and post-harvest (e.g. transport, storage, producer pre-financing, and drying costs)
- Quality control tools for assessing the kernel out-turn ratio (KOR)
- Inputs required for annual crops (e.g. for seeds and fertilizers), since many cashew farmers diversify and manage risk through inter-cropping

Working capital for intermediate traders, in order to purchase RCN, as today they are fully financed by exporters' advances.

Investment funds for processors for capex (equipment and construction of plant construction) and working capital to buy RCN stocks. Processors have to buy all yearly processing stock within three months of harvesting

Additionally, extension services will eventually exist in SeGaBi and this will create a need for the extension agents/service providers for financing for tools to deliver their services successfully.

[37] TechnoServe analysis. See Annex 12.4 on the assumptions and calculation.

6.3.2 Key supply-side constraints

The main constraints related to the supply of financial services in this region are as follows:

Political instability and economic fragility, which are much bigger factors for Guinea-Bissau and the Gambia than for Senegal. Multinationals do not lack interest in setting up in Guinea-Bissau, but they remain reluctant because of the high level of country risk.

A high perception of risk for actors in the cashew sector. Some of this perception is grounded in reality: high default rates in light manufacturing, processors' limited financial management skills and sound technical knowledge, high volatility in RCN markets, and slim margins (due to high RCN prices). A fragile risk management system exacerbates this issue. Bankers' lack of familiarity with the cashew industry, however, also contributes to this perception. The banking sector's overall ignorance of cashew is also a consequence of limited collaboration between the financial sector and the agricultural technical services (whether donor or state driven).

Strong information asymmetry. The lack of reliable data for agricultural project analysis and decision-making support for agricultural promoters inhibits financial actors from properly evaluating and mitigating risks, and properly supporting clients.

Absence of appropriate risk management instruments related to agricultural financing (subsidies, guarantee fund, agricultural insurance) mean high rates of default are difficult to manage.

General market conditions that lead to high costs. High rates of poverty mean a low volume of financial transactions of relatively small size, and rural areas are marked by remoteness and low population density. This prevents institutions from achieving economies of scale and makes loan monitoring expensive.

6.3.3 Key demand-side constraints

The financing need of cashew industry stakeholders and the difficulties inherent in accessing finance vary according to their category and role. However, there are a number that constrain all actors, including:

- Sector organization is weak and unclear, no clear definition of roles, weak controls of trade flows (traceability) and land border trade;
- Low financial capacity for self-financing, low collateral backup;
- Very frequent fraud and non-compliance (for example, a merchant who removes a lot of cashew bags and does not reappear, or a producer who has received pre-financing and sells to a merchant other than the one who provided this pre-financing);
- Very limited financial and business skills (lack of profitability analyses and basic accounting systems, and weak business plans);

- Lack of understanding of different financing instruments and their different usages (equity vs. debt)
- Conditions for access to financing ill-adapted to sector conditions (high interest rates, guarantees, and various other banking and legal fees)
- High exposure to changes in world cashew prices and currency risks;

Key producer constraints include:

- Very small-scale farmers with no basics on farming as a business culture (producers focus on absolute costs rather than returns);
- Low level of literacy and technical know-how to improve productivity;
- Low level of producer organization which could negotiate a financing package to serve the group;
- Low level of productivity, including aging orchards;
- Exposure to food insecurity, causing bartering cashew nuts with rice.

Key processor constraints include:

- Low business understanding, weak entrepreneurship, ad hoc business decisions on investments, unproductive technologies and bad layouts;
- New start-ups, high performance risk, production losses, no quality technical assistance to cover the risk;
- Weak market information systems, high volatile markets, high perception of risk;
- Limited equity participation, plant and equipment both valuation is far below of their financing needs. Collateral not sufficient to cover loans;
- Limited or non-existence of direct farmer's linkage, series of intermediates, bad debt on procurement;
- Low produced quality, weak food safety compliance, high market risk and price risk;
- Under competitive nature of emerging industry, Government's responsiveness to address policy related competitiveness is limited.

Key constraints of marketing players (traders, kernel distributers) include:

- High volatile market trends, dependence of foreign importers, particularly Indian ones, results in an operating environment that is not transparent;
- Low negotiation capacity; limited market information due to the fragility of the Market Information System (MIS);
- Inadequate storage infrastructure leading to loss of quality and quantity;
- Limited capacity to raise funds at the sub-regional and international levels;
- Weak accounting systems, unclear sales contracts, business conducted on a cash against documents (CAD) rather than letter of credit (LC) basis.

6.4 Market information systems

In Côte d'Ivoire currently, several thousand farmers in all counties receive information directly on their mobile phone on prices and the market situation. Once received, these farmers are able to broadcast the information to friends and family around them. Additionally, dozens of traders, all major processors, large carriers and officials of several ministries receive weekly information from the Information Service. This system of price diffusion by SMS text is currently underdeveloped in SeGaBi. Instead, information is mostly transmitted through word-of-mouth and national and community radios. Research reveals that the majority of producers in the SeGaBi region have little knowledge of current prices and continue to sell at any price offered by the buyer.

Nevertheless, there is a growing trend among producers to attempt to gather price information before selling. In some cases, this research takes the very simple form of a few phone calls to contacts in the cities. Yet there are also two major MIS platforms[38] serving the cashew industry in the SeGaBi region. For producers, N'kalô, set up by the USDA-funded, International Relief and Development (IRD)-implemented Senegambia Cashew Value Chain Enhancement Project, phase 2 (CEP 2), is the most formal system of collecting and disseminating market prices in the SeGaBi region. N'kalô is a weekly SMS service, initially established in Côte d'Ivoire by French NGO RONGEAD in collaboration with the African Cashew Alliance (ACA). The information mostly includes prices on farm gate level and on analytical advice on the pricing of nuts during cashew harvest season. N'kalô was operational in 2017 in both Senegal and the Gambia, but producers questioned the accuracy of the information distributed. N'kalô is also a regional platform that collects all information and disseminates to almost all African countries producing cashews. N'kalô is largely donor-driven, however, making its long-term financial sustainability unclear.

The other available MIS platform is CashewInfo weekly, which is a weekly email service that discusses the global scenario of cashew business and covers information on the global kernel market. CashewInfo also provides various analytical support on price variations and provides future projections on pricing trends. It is the most credible source of information on cashew markets, read by cashew buyers and processors all over the world. They conduct primary data collection at the source and provide the best analytic approach to market understanding. Unlike N'kalô, CashewInfo is a purely private sector entity, with no outside support. While these two platforms function in all three countries, implementation in Guinea-Bissau still needs to be extended.

In Guinea-Bissau, the MIS is through collaboration between ACA at the international level, and ANCA and the National Association of Guinea-Bissau Farmers (ANAG) at the national level. The ACA provides prices from other countries and receives farm gate prices from Guinea-Bissau. ANAG members in the regions collect prices at weekly levels

[38] See Annex 13.4 for examples

and forward them to headquarters and the ANCA; this information is passed on to radios for weekly broadcast during the harvest season. Several producers met with during this study in rural areas claim to inquire about cashew prices by radio. The ANCA produces, in principle, news bulletins from the market, but they are not yet available.

Recently in Guinea-Bissau, the African Cashew Alliance, in collaboration with the Private Sector Rehabilitation & Agribusiness Development Project (PRSPDA) has provided the National Cashew Agency of Guinea-Bissau with a market information service for cashew marketing, which will be fully functional for the 2018 cashew season. ANCA's information service will use a number of communication outlets such as mobile phone agencies for the daily dissemination of information on cashew market trends. The goal is to reach all producers in the country with this information. The service will also use community radios in collaboration with technical partners to sensitize cashew market stakeholders at the grassroots, in order to create a transparent market for all. With this new tool, cashew stakeholders in Guinea-Bissau will all have access to the same level of information for the next marketing season which is scheduled to be launched in March 2018.[39]

SeGaBi producers are recognized internationally for the quality of their nuts, however, they operate in disorganized and rumor clad national and regional markets. The lack of reliable information within and across each country disrupts both the national and regional value chains. When farmers do have reliable information, they are often unable to leverage it to achieve a higher price either because the quantity they are selling is too low or because their eagerness to gain revenue from sales puts them in a weak bargaining position.

[39] ACA, 2017

7 Guinea-Bissau value chain analysis

Located on the West Coast of Africa, Guinea-Bissau covers 36,125 km^2 and has a population of only 1.8 million. It has long been ranked among the ten poorest countries in the world due to socio-political crisis and instability. Guinea-Bissau has built its economy on agriculture, with cashew as its main cash crop. RCN exports now account for around 90 percent of the country's total export earnings.[40] Consequently, the cashew sector is now the main engine of Guinea-Bissau's economy. Value addition to the country's main product, cashew, represents a significant income-generating opportunity for Guinea-Bissau. Despite several attempts to develop the processing sector, however, Guinea-Bissau currently exports approximately 97 percent of produced cashew in raw form. This has led to a huge opportunity loss of earning additional revenues for the country.

The cashew sector has been affected by a history of disruptive government interventions, including unrealistically low purchase prices of RCN, cashew trade regulations, taxes on kernel exports, and unclear and dubious explanations of these regulations. These interventions resulted in the Government gaining a handful of resources for the sector, but these limited investments did not improve cashew cultivation. Moreover, weak sector organizations like ANAG, the Cashew Promotion Center (CPC), Association of Cashew Processors of Guinea-Bissau (ATC), and ANCA have not been able to successfully leverage a private sector voice to lobby for sector needs.

Another critical constraint for Guinea-Bissau's cashew sector is poor physical infrastructure. Unpaved and degraded secondary and tertiary roads result in un-navigable conditions during the rainy season, and challenging conditions otherwise. There is limited available warehousing capacity. These issues especially hurt upstream market linkages, as well as increase post-harvest losses. Additionally, electricity services in the country are unreliable and expensive, making it difficult and costly for processing plants to operate.

The port of Bissau also requires rehabilitation, as it is plagued by long processing times and size limitations that do not allow the use of larger ships. The port of Bissau is currently less competitive compared to others in the SeGaBi region. Handling costs are one-third higher and vessels spend up to 25 percent more time in port compared to the ports of Banjul and Dakar. The port of Bissau is designed to handle 5,000 containers per year but is overloaded with more than 20,000 per year—leading to higher costs and delays. Siltation (the accumulation of silt and other similarly sized particles) from the Geba River at the port of Bissau has reduced the depth of the port, and therefore the number of anchors available at the port from four to only one or two. As a result, the vessels are experiencing long delays during the cashew export season, forming a waiting fleet off the coast of Bissau. Port handling is similarly known for being inefficient and expensive.

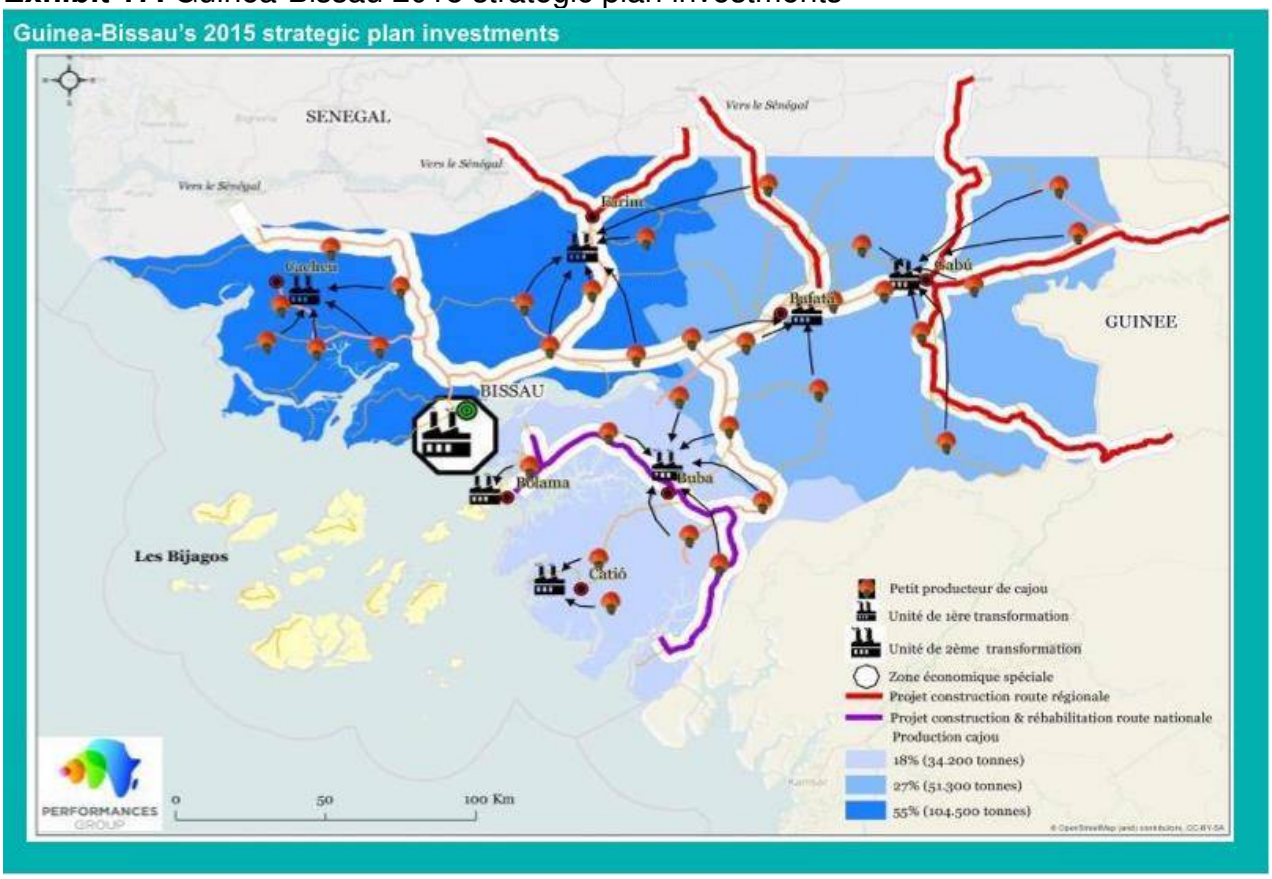
[40] World Bank, 2005

To this end, Guinea-Bissau recently finalized a new strategic plan in March 2015 that establishes major investment poles and operational guidelines for 2015-2020. If implemented, various investments should increase the country's competitiveness in global cashew markets. The exhibit below maps proposed investments in road rehabilitation and construction, the creation of a special economic zone around Bissau, and strategic locations of medium and big investments in cashew processing. Some of the major focus areas of the strategic plan that could influence the cashew value chain include:

- Rehabilitation of the national roads and construction of new roads (145 km national roads, 498 km regional roads).
- Rehabilitation of tertiary roads (300-350 km).
- Increasing the capacity of the national electricity grid by 155.5 MW.
- Maximizing value creation through the creation of a technical assistance mechanism at each level of the cashew value chain, including: farmer training on good agriculture practices, harvest and post-harvest handling; developing an enabling environment for local processing; enhancing access to finance for value chain partners; improving market information systems and market linkages.

Progress to date has included some electrification and road rehabilitation initiatives.

Exhibit 17: Guinea-Bissau 2015 strategic plan investments[41]



Guinea-Bissau's financial industry is also under-developed. In total, Guinea-Bissau has five commercial banks, including Banco da Occidental (BAO), Banco Da União (BDU), Ecobank, Orabank, and Banque Atlantique (a branch of Banque Atlantique Côte-d'Ivoire, established in 2016). Financial institutions are concentrated in the capital, Bissau, with few service centers located in rural cashew producing regions. Banks provide loans to various RCN traders but are skeptical to support processors due to their past negative experience. In general, cashew trading and its role in the value chain is better understood by banks, but there is still a need to educate bankers and financial institutions on the opportunity offered by investment in processing.

At the microfinance level, institutions, such as savings and credit cooperatives, were born from non-governmental organizations (NGOs) or donor-funded projects, often without concern for long-term independent financial sustainability. The Fund to Promote the Industrialization of Agricultural Products (FUNPI), for example, was created and administered by the Government to increase access to finance. However, credit decisions were often not based on fair, transparent due diligence and credit approval processes.

[41] Republic of Guinea-Bissau, 2015

Credit was often directed to government priorities rather than financially viable private enterprises, which led to high rates of default, and, ultimately, closure of the institution.

7.1 Value chain overview

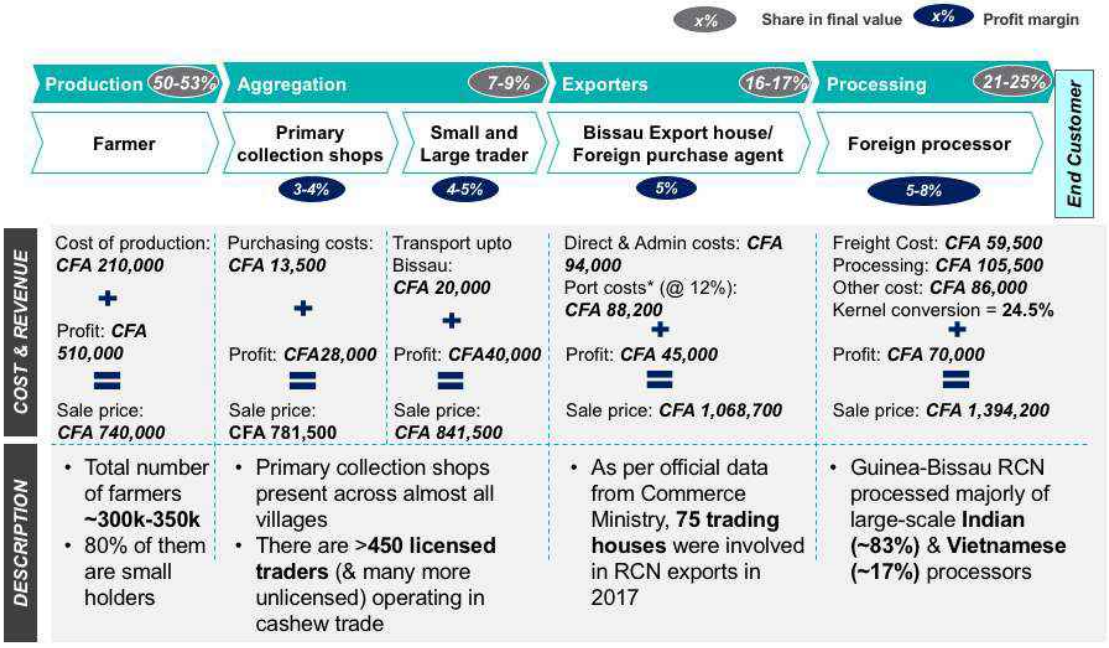
As in other African countries, the cashew value chain of Guinea-Bissau relies significantly on RCN exports and is poorly integrated into the global cashew market. The fragility of the value chain is compounded by political instability, weak research and development efforts, and minimal access to extension services.

Guinea-Bissau has a strong competitive position in terms of domestic RCN production and transformation yield potential (i.e. processing output). However, the value chain is constrained by a weak institutional environment, including limited processing/industrial activities, poor infrastructure, and low commercialization. Guinea-Bissau's RCN export market is currently dominated by Indian buyers. The value chain would benefit from a more diversified export market, with improved information flow and active measures to promote and attract clients from other countries and geographies. Adding processing of cashew by-products, such as the cashew apple, would also make the value chain more dynamic and create better opportunities for sustainable development.

The current cashew value chain in Guinea-Bissau is fairly long and complex for a country of its size. Given the lack of strong farmer cooperatives and limited government regulation, multiple traders operate within the chain and have capacity to influence and alter trade dynamics to suit their needs. Approximately 98 percent of RCN production is exported to foreign processors, with only negligible amounts (around three percent), processed locally.[42]

[42] Calculated based on data collected from interviews in Guinea-Bissau, December 2017.

Exhibit 18: Current cashew supply chain margins in Guinea-Bissau (per one MT of RCN), 2017[43]



As shown in the exhibit above, the current cashew value chain in Guinea-Bissau is made up of 5-6 key actors, with 3-4 intermediaries between the producer and foreign processor. The role of each stakeholder is varied and is explained below.

Farmers: There are currently estimated to be about 300,000–350,000 cashew farmers in Guinea-Bissau, though the exact number is unknown. Of these, 80 percent are smallholders, operating on only 1-2 hectares of land. The typical Bissau-Guinean producer earns around CFA 510,000 per MT of RCN[44], which represents about 50–55 percent of the final market value, with considerable potential for growth. The two key constraints farmers face are: (1) low productivity, which stems from limited maintenance of planted orchards, coupled with an absence of extension or technical support services; and, (2) over-reliance on RCN revenues, as nearly all producer income comes from RCN. Cashew apple has little-to-no contribution to producer income, as currently almost all of the by-product is wasted due to the absence of a market for the product**.**

Traders: Generally, there are two to three levels of traders between the farmer and export house. All individual traders earn hefty commissions that aggregate to a 7-9 percent share

[43] Figures presented in this exhibit and in the discussion that follows are based on TechnoServe analysis and extrapolation of multiple primary and secondary sources.
[44] While the government sets a fixed price of 500 CFA/kg, in the last three years the actual RCN price reported by producers has been higher. In 2017, the average was 725-740 CFA/kg. (Interviews in Guinea-Bissau, December 2017).

of the final market value. Any trader operating in the countryside must have an Alvara (a license issued by the Ministry of Finance), which costs about CFA 80,000 for the basic level. These licenses are not based on a strict definition of functions or obligations. Traders pay a fixed annual fee (CFA 50,000 for the first level of merchant) to the Ministry of Finance for each scale, regardless of the quantity weighed. The authorization to trade is hence known as "balanca," since it is accompanied by the need to have a balance. Any attempt to manipulate the scale may be punished by confiscation of the entire load of RCN collected with it. Traders can be divided into two groups:

- **Primary collection shops**: Farmers drop off their RCN at a primary collection shop, of which there is at least one in every village. Primary collection shops collect and aggregate RCN from multiple farmers and sell it to small and large traders. They earn a significant commission of approximately CFA 25,000-28,000 per MT of RCN.
- **Small and large traders:** This category of traders is a group of middlemen who cut deals between the export houses and primary collection shops. One or two middlemen intervene, depending upon the distance between the specific village and Bissau. As per official records in 2010, there are more than 450 licensed (and many more unlicensed traders) operating in the cashew trade. At this level, they make CFA 35,000-40,000 per MT of RCN as commission.

The city of Safim, on the outskirts of Bissau, is known for the number of large commercial stores: warehousing of 5,000 MT or more can be found there. The majority of these stores were built specifically for storing cashew and some are currently under construction. These large centralized warehouses are used to accumulate sufficient quantities for embarkation at the port. In principle, all nuts must be dried in the production area before being transported. Nevertheless, exporters, lacking confidence in drying upstream, do a second round of drying before placing the raw nuts in storage at Bissau.

Exporters: This group generally consists of domestic export houses or purchasing agents of international trade groups and foreign processors based in Bissau. Since nearly 98 percent of domestic production is exported to foreign processors, exporters play a very critical role within the supply chain. They earn about CFA 45,000-50,000 per MT of RCN, capturing about 16-17 percent of the final market value. Exporters also incur a variety of costs, such as warehousing and storage, packaging, port costs, etc. As per data received from the Ministry of Commerce, there were 75 trading and export houses who exported RCN in 2017.

In principle, wholesalers and exporters are all Bissau-Guineans, since the licenses are limited only to nationals. In practice, foreign (mostly Indian) exporters leverage their financial weight to hire Bissau-Guinean nationals, who find it difficult to obtain financing from local banks, for this purpose. In fact, license holders often become employees or suppliers to foreigners. Exporters are the last link in the chain of cashew marketing in Guinea-Bissau before RCN are sent to Asia for processing.

Foreign processors: The final destination for Bissau-Guinean RCN is primarily Indian processors, who purchase approximately 90 percent of exports. The total processing cost per one MT of RCN, including financing[45] and port costs, averages around CFA 220,000-240,000 with processors earning around CFA 70,000-80,000 per MT of RCN as net profit. This raises concern domestically as external foreign processors currently enjoy more than one-fourth of the final market value. This represents a significant missed opportunity for the economy of Guinea-Bissau, as local cashew processors and smallholder farmers are missing out on this value-added income.

Estimated value chain demand for finance

The total estimated demand for finance over the next six years for all relevant value chain actors is US$82m. Financing is not estimated for traders and producers in 2018 as it is assumed that some time is needed to establish relationships and sensitize these groups.

Table 3: Estimated Guinea-Bissau cashew sector financing need, 2018-2023 (US$, thousands)[46]

	2018	2019	2020	2021	2022	2023
Processing	$4,613	$8,339	$11,597	$14,080	$17,372	$21,754
Trading	$-	$368	$589	$662	$736	$736
Production	$-	$68	$113	$150	$225	$270
TOTAL	**$4,613**	**$8,774**	**$12,299**	**$14,892**	**$18,333**	**$22,760**

7.2 Sector organizations

The vast majority of cashew value chain actors in Guinea-Bissau do not belong to any organization. However, there are some formal sector structures that are presented below.

The National Association of Farmers of Guinea-Bissau (ANAG) is a network of producers that covers all agricultural production areas and has branches in all regions of the country. ANAG is the most comprehensive organization in agriculture in Guinea-Bissau, with 52,000 members (out of approximately 200,000 rural families) and, according to management, 684 agents, including extension agents, trainers, journalists, etc. ANAG is assisted by ACA and ANCA, which collects and disseminates market information via radio.

ANAG has expressed difficulty mobilizing resources to initiate actions on the ground as few members today pay the required membership fee. Across the country, only a few hundred members contribute to support network activities. In the past, activities have been funded by donors through projects such as the USAID-funded trade and investment

[45] In India and Vietnam financing costs are around 6-9 percent and 5 percent, respectively.
[46] TechnoServe analysis. See Annex 12.4 on the assumptions and calculation.

promotion support project (TIPS). ANAG needs capacity building on best agronomic and harvest and post-harvest practices. This will allow them to have a technical package for their members to improve their yields and quality. There is also a need for resources to invest in transit warehousing and for the acquisition of technical kits to provide services to members.

In general, ANAG members do not organize for the collective sale of nuts. An exception is an informal subgroup in São João, in the Bolama region. This sub-group of eight producers has no funding or storage facility, instead members store their nuts individually in their homes. When the volume reaches about 20 MT, a representative calls several exporters in Bissau to determine the prices they can offer. At the most opportune time, the group chooses a buyer, who sends a truck to the village to collect the nuts in exchange for money in cash. This example shows the potential of collective action, even in the absence of external funding and infrastructure.

KAFO is a farmer's federation with a national scope, but most of its activities are concentrated in the regions of Oio, Cacheu, and Bafatà. Its rural headquarters is in Djalicunda, Oio, with an office in Bissau. KAFO has more than 23,000 members in 900 localities, with a strength of 600 volunteer extension workers. KAFO also has 20 rural animators who are paid by the PRSPDA project. KAFO is one of three organizations that PRSPDA supported for the direct sale of nuts to Arrey Africa, in Bula. Another development project provided support for the production of juice and jams made from cashew apples.

Regional cooperatives also exist, such as the Producers' Organization of the Region of Oio (OPRO) and *Cooperativa Agri-Pecuària de Jovens Quadros* (COAJOQ), in Oio and Cacheu, respectively. These groups are functional and active thanks to the support of external financing, such as PRSPDA. They provide technical advisory services to farmers and organize collective sales of cashews. In 2017, OPRO and COAJOQ also worked with Arrey Africa and were able to receive a better price thanks to this cooperation.[47]

Ajuda de Desenvolvimento de Povo para Povo (ADPP) is an NGO that began in the 1980s in Bissorã en Oio. ADPP owns 450 ha of cashew orchards, which it lends to individual producers. The project organizes producer groups in villages. ADPP organizes collective sales of RCN, providing storage, consolidation, and research for customers. They also provide some support to farmer groups in the form of training on nutrition and health, and farm practices. The impact of ADPP's efforts is unclear.

The presence of KAFO, OPRO, COAJOQ, and ADPP in the north of the country has introduced some knowledge of good agronomic practices among the population.

[47] Interviews with Arrey and PRSPDA, December 2017

Centro de Promoção do Caju (CPC) is a demonstration plant in the suburbs of Bissau, created in 2005 by FUNDEI in partnership with the government and the EnterpriseWorks/No Fiança/USAID project. In principle, it serves two purposes: it is a training center for small-scale processors of nuts and cashews, and it is also responsible for bringing shelled kernels into small units, finishing them (last drying, classification, packaging), and to supervise their export. FUNDEI is closing operations by mid-2018, and at present, CPC is not operational.

The National Cashew Agency (ANCA) is the regulatory authority for the cashew sector. It was created in 2013. The structure is directly attached to the Prime Minister and replaces the National Cashew Council, as outlined by Decree 2005/03, for the marketing of cashew nuts. Beyond the regulation of the sector, ANCA's mission is also to design policy concepts for the development of the value chain. It is responsible for raising awareness and building the capacities of value chain actors, and through its general council body, for bringing together the main actors in the sector. Until 2016, ANCA did not have financial autonomy, which severely limited its operability. In 2017, a new levy on RCN exports is directed at channeling funds to ANCA (CFA 3 per kg of RCN exported). As a result, ANCA recently moved to a new office and hired necessary staff to design and implement their strategic plans for the sector's development.

The Chamber of Commerce, Industry, Agriculture and Services (CCIAS) is a consular body that defends the interests of its members. It is a consultative as well as an executing body. Its members include buyers and resellers of cashews and local exporters. According to a 2016 trade integration analysis done for the Enhanced Integrated Framework (EIF) and UNDP, CCIAS is recognized as a public institution under private law. It is under the supervision of the Ministry of Commerce and is involved in the formulation of trade policy. The 2016 CCIAS budget was fed by a CFA 1.50 per kg tax on cashew exports, a CFA 1 per kg tax on imports of rice and cement, and the financial contributions of its members. This financing structure is not only fragile. It also does not align with the organization's ambition to generate revenue through fee-based services rendered to the private sector; much remains to be done to market these services. On paper, the skills of officials within the chamber are very broad, as is the range of private economic sectors represented within it. In reality, the capacities and resources of CCIAS are modest in view of the considerable needs of its members. Still, CCIAS is very influential.

It should be noted, however, that CCIAS helped to create the **Center for the Formalization of Enterprises** (CFE). CFE was established as a one-stop-shop for businesses to formally register with the Government, allowing investors to access all prerequisite information and submit necessary documentation in one place. It has had a dramatic impact on reducing the time necessary to register from two to three months to 7 to 15 days.

The Cashew Exporters and Importers Association, despite the title, is an organization that represents, in the eyes of some actors (including many exporters), only a minor part of the national exporters. For this reason, its influence is judged by these limited actors. The embrace of both exporters (Bissau-Guineans) and importers (foreign importers of Guinea-Bissau's raw nuts) is unique in view of the subordinate relations between these two groups. This association, which has been active since 2008, has traditionally had a strong influence on the bottlenecks that mark the course of the cashew campaign: taxation decisions (including the export reference price on which tax is paid), port handling, the perpetuation of the levy of the FUNPI tax, etc.

The ATC-Caju structure has brought together artisanal processors since the days of the USAID/EnterpriseWorks/No Fiança project. More recently, under the leadership of Florentino Nanque, the current President of ACA, ATC-Caju has extended its mandate to all processors, including industrial processors. Active membership of the industry, however, remains to be achieved. ATC-Caju manages CPC, discussed above. Using FUNPI funds, in 2015, ATC-Caju bought raw nuts and automated processing equipment for distribution to craft units. In the future, if there is a cadre of technical service providers at the ATC-Caju's processing plants, this group could organize themselves into guilds to approve standards, tariffs, areas of activity, etc.

There is also a commission responsible for the reform of the legal framework of the sector, including a committee composed of representatives of ANCA, Chambers of Commerce, PRSPDA, and other interested persons. The committee is working on a project of four new laws that would better guide behavior of sector actors and contribute to increased professionalization, based on best practices and lessons learned from other major African producers such as Côte d'Ivoire, Mozambique, and Tanzania. According to some participants, this project is proceeding slowly and adoption of these new laws is not expected to be realized soon. Unfortunately, relevant cashew industry stakeholders have also indicated that the committee has done little to-date to engage with them to move the process forward.

7.3 Production

Cashew was introduced by the Portuguese during colonization for the purpose of reforestation. Historically, cashew production was minimal at around only 30,000 MT in the 1990s. However, in the last 10-15 years, rising RCN prices have attracted new producers, as well as motivated existing cashew producers to invest in expansion. Many farmers now favor cashew over other cash crops such as peanuts, beans, and cassava, both for revenue potential and because cashew is viewed as a lower-maintenance crop. A large share of Guinea-Bissau's cashew trees is, therefore, currently hitting peak production.

These trends have led to a boom in production that has made Guinea-Bissau the fifth largest producer of cashew nuts in the world, an impressive feat given a general low

capacity of farmers and very limited government support. RCN production more than doubled from around 100,000 MT in 2005 to about 208,000 MT in 2015, implying a strong eight percent CAGR[48]. This production growth happened while still naturally producing high quality nuts that are recognized worldwide by key cashew players. Guinea-Bissau's basic RCN has an average outturn rate of 52-54 lbs per 80 kg bag[49]. This type of quality is highly sought after by processors, and as a result, Guinea-Bissau's RCN commands a premium of about $100–300 per MT over RCN from other countries in the region[50].

In general, climactic conditions in Guinea-Bissau are optimal for cashew cultivation. Yearly rainfall of 1,000 mm is well within the crop's 500-2,000 mm optimal range. It is estimated that about 24 percent of national territory (850,000 ha) is under cashew cultivation.[51] There is no area specifically dedicated to cashew production, rather, all regions of the country are involved. Nearly 80 percent of this area is cultivated by small farmers[52], with cashew revenues account for 26-45 percent of household income[53]. The majority of producers are small scale, with the average farm size at one to two hectares[54].

As with most other African countries in the sub-region, cashew production is dominated by the men that own the land. In general, in regions where land is scarcer, few women own and manage their own plantations, since their ability to access land depends on their fathers or husbands. However, women (and children) play a key role providing labor for the full process of cashew cultivation, from planting and maintenance to harvesting and storage. In addition, where there is a market for the cashew apple, women play the lead role in its marketing.

7.3.1 Key production challenges

While regional variation exists, and is discussed in further detail below, various constraints and threats challenge cashew production in all regions.

Research and development

It is unusual to find a country where a sector plays such a major role in the national economy, but key stakeholders (producers, industry associations, processors, etc.) still have very limited sectoral knowledge. Research institutions exist, but their average awareness is currently below that of a basic understanding of agronomy. In general, the country has very few cashew experts. Likewise, national cashew research is almost at a

[48] TechnoServe internal database
[49] No studies have been done on why the outturn rate is so high in Guinea-Bissau. Cashew is a new crop to the region, and varieties grown there have smaller nuts but larger kernels and relatively thinner, and therefore lighter, shells as compared to RCN in other regions.
[50] TechnoServe analysis based on multiple sources
[51] Rabany, Ricau, and Rullier, 2015, p.24
[52] Mendes, 2009
[53] Hanusch, 2016
[54] Mendes and Pacheco de Carvalho, 2014

standstill and has limited knowledge on how to best support farmers with best practices and information on improved varieties.

INPA, the National Agricultural Research Institute, is aware of regional research initiatives, such as CNRA's work in Côte d'Ivoire on the identification of mother plants and its grafted seedling program. However, the lack of resources at the national level has, to-date, prevented the development of technical packages and other solutions for Guinea-Bissau's cashew industry. INPA researchers in Québo had identified some parent trees with good characteristics, but the country has not yet developed seed or grafting plants. There are a few nut varieties existing in Guinea-Bissau, but the name of these local varieties differs from place to place as farmers and other stakeholders have named them independently. These varieties have no standard technical definitions. Furthermore, no studies have been done to quantify the different productivity, quality, and other characteristics of these varieties.

INPA could benefit from partnerships with the sub-region's other national research institutions. For example, such relationships could lead to the establishment of seed and grafting parks and access to research collected on variety testing.

Extension services and technical support

In addition, the extension structures of Guinea-Bissau are almost non-existent. Apart from a small minority of producers who have benefited from donor-financed projects, most farmers do not benefit from any technical support. There are regional directorates of the Ministry of Agriculture throughout the country, but there is no management program specifically dedicated to cashew. The managers assigned to regional directorates are limited in number, notoriously lacking in capacity, and faced with a lack of resources to provide agricultural technical advisory and training for farmers. In general, qualified and experienced staff are concentrated at the central level. There is also no formal system for the production and distribution of seeds or other agricultural inputs. Recently, with the help of experts, the PRSPDA project designed an extension model to work with cashew farmers. The model is yet to be tested in the field.

Agronomic practices

Though production is at its peak, the lack of information and expertise is reflected in the state of plantations, which are marked by low yields per hectare. In previous and ongoing projects, some producers have demonstrated technical knowledge of good production practices, but application of these practices remains low. In fact, on average, most producers are not informed about variety selection, tree spacing, maintenance, pest and parasite control, etc. Comparatively, the plantations in Cacheu and Oio are generally the most regularly cleaned in the country, though farmers in this region still require more capacity building to properly implement all best practices.

Lacking knowledge of good agronomic practices, farmers follow the logic that the more trees there are on their farms, the more they will produce. Therefore, most plantations have excessive tree densities, with spacing of 2-5 meters between plants (compared to the ideal of 8-10 meters). It is only recently that small producers have begun to understand that nuts occur at the margins of the crown of foliage, and that a wider spacing between plants is more favorable to productivity. Still, there is very limited evidence of farmers applying these improved practices. Moreover, few trees have been pruned, and those that have were done incorrectly. Overpopulation and limited pruning in plantations also lead to merging canopies, which is a dangerous setting in the event of pests or disease.

In certain areas, such as in the South, trees have surpassed their peak production age, and plantations are suffering from low yields that are less than one-third of actual potential. At 30 years of age or older, these older plantations should have already been cut down and replaced. In general, very few older plantations have been rejuvenated at all. Instead, when the productivity of an orchard falls, it is most often abandoned. At this point, even the collection of nuts becomes marginal.

Overall, if plantations do not soon receive proper care, there will be a large risk of disease breakout. Any such calamity would lead to significantly lower production, as has happened in the past in eastern and southern Africa (Tanzania and Mozambique). In Biombo, for example, the general situation faced by orchards shows a progressive decrease of yields. To maintain current production levels and sustain growth there is a need for urgent intervention to improve farmer's capacity to implement good agronomic practices.

Pests and disease

Even more worrisome to cashew production is evidence of repetitive insect and pest attacks, including stem borer, branch griller, white fly, and helopeltis, which have begun to drastically reduce plantation productivity. This situation is particularly noticeable in the regions of Bolama and Biombo, where it is observed that plantations are gradually dying because of these untreated attacks. If this situation spreads to other regions, Guinea-Bissau could lose what is the source of more than 90 percent of its external income, further entrenching rural communities deeper into poverty.

Planting materials

Similarly, the grafting technique of cashew plants is unknown in Guinea-Bissau. Currently, no one in Guinea-Bissau is grafting new seedlings, though INPA and some projects like PRSPDA or ADPP claim that they have identified a few high-yielding varieties/mother trees locally[55], which can be used as genetic material for grafts. Interviews with them demonstrated that they are aware of the needs and are looking forward to working more

[55] These varieties were not identified by specific names, they are simply trees that were selected from the region based on their yield. There are no known nurseries currently following the correct technical processes for grafting.

on it now. Identification of high-yielding trees which are also resistant to pests and diseases should be a top priority for the country, as it will require large-scale efforts to replace old plantations to prevent the possible outbreak of disease and also to plant high-yielding varieties in new production zones. Identification and planting of high-yielding varieties will allow Guinea-Bissau to sustain current production levels and maintain growth. It is important that replacement and planting planning takes into consideration timing, as planting by seed takes 4-5 years to start producing cashews, whereas grafted plants start producing in years 2-3.

A nursery of the Directorate of Forests exists in Nova Vizela, not far from Bissorã, where there are a limited number of cashew plants, un-grafted, which are sold at CFA 500-700 per unit. Most of these plants are sold to some projects as local farmers are not ready to pay this amount for seedlings, especially when there is no evidence, or guarantee of success as these plants are not grafted plants. At this price, a farmer is required to spend CFA 50,000-70,000 only on seedlings, which is a significant cost to the farmer who is accustomed to direct sowing. Guinea-Bissau's seed multiplication (un-grafted) will take years, as they do not yet have any structure in place to address this issue.

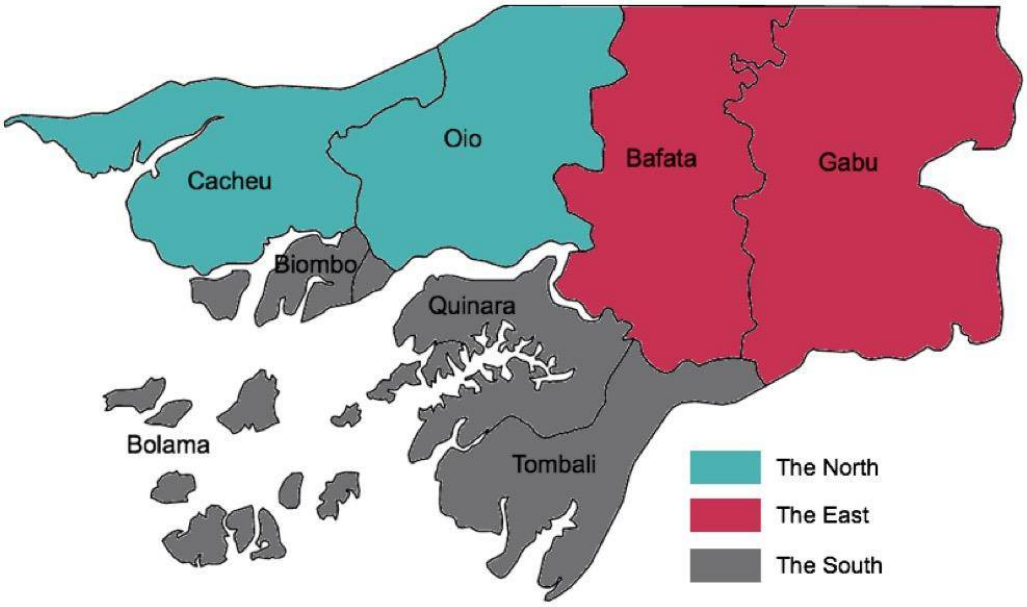
Business skills and access to finance

It is only on medium and large plantations that cashew production is conceived and treated as a business. Access to finance is a new concept for farmers to consider for their farm expansions or to address lower yields.

7.3.2 Regional variation

Cashew production can be split regionally into three zones: the North, South, and East of the country. While the issues and conditions discussed above are found everywhere in the country, each zone has its own specific set of prevailing conditions, strengths, weaknesses, and potential. These unique considerations are discussed in detail below.

Exhibit 19: Cashew production zones in Guinea-Bissau



The North: Cacheu and Oio

The North includes the regions of Cacheu and Oio where productivity is high at a minimum 400-500kg/ha. In fact, thanks to previous and ongoing projects, some producers demonstrate technical knowledge of good production practices.

The best productivity is located in the region of Cacheu, which alone accounts for more than a quarter of national production. Here, the climate and soils are conducive to cashew cultivation, and orchards are 15-25 years old, still at the peak of their production.

Oio, a neighboring region of Cacheu, also has very productive orchards. A significant number of Oio producers have benefited directly or indirectly from the presence of projects like ADPP and PRSPDA that promote the dissemination of good production practices. Oio producers, are therefore the most advanced in this regard. Others have realized on their own that trees that are densely planted do not produce high yields. The most common orchard maintenance practices that can be observed on farms is thinning, pruning (removal of unwanted branches to allow the tree canopy to fall on the sides to create extra space for production), and weeding and cleaning (removal of grass and other plant species). As a result, orchards, aged 10-20 years, are relatively clean and less dense.

The South: Biombo, Tombali, Quinara and Bolama

The South is composed of Biombo[56], Tombali, Quinara, and the islands of the Bolama region. This group of four regions contains the oldest plantations in the country, with trees often more than 30 or 40 years old. As the productivity of cashew trees begins to decline after they reach 25 or 30 years, these orchards have largely exceeded their period of high productivity. Under efficient production management, such orchards would have already been cut down and replanted. Furthermore, maintenance in the South has been neglected, so orchards are characterized by uncontrolled branching, invasion by wild vegetation, intense attacks by insects and pests, and low productivity of 250-350 kg/ha.

In this region pests like stem borer and branch girdler can be seen throughout the year and mosquitos and other pests during harvesting period. The damage is notable especially in the South of the country, where producers complain and ask for access to treatment, which due to lack of research, is not yet known in Guinea-Bissau and can cost more than the damage itself. At present, despite the loss of certain branches before or during the flowering period, infected trees do not die and less than 10 percent of branches in a plantation are affected on average. However, there are some cases in Bolama and Biombo where entire orchards are infected, and the situation is only getting worse as such attacks multiply fast. For example, in Kogi state in Nigeria, the local government areas of Ida and Umomi have been badly affected by these pests and within four years, the impact has increased to almost 65 percent of branches[57]. If these attacks in the South are not addressed, they could spread to other cashew producing zones.

In the islands of Bolama, the pest situation is alarming. There are plantations that have been completely wiped out by multiple pest attacks. Other common diseases in these areas are whitefly, which causes the leaves to cover with a black residue and dries them out, and helopeltis—which sting the stems of the flowers, also causing them to dry. Each individual pest needs to be addressed appropriately in order to increase the production of the tree and prevent spreading to other regions.

Shrubs, grass, and indigenous trees grow in plantations, and without proper care, plantations become forests. This makes the passage of collectors difficult and causes productivity to be reduced through loss of nuts among the anarchic vegetation. On these plantations, the presence of many young cashew trees resulting from the germination of nuts never collected has also been observed.

Ultimately, production in the South needs immediate attention to ensure farmers adopt best practices, especially thinning of trees, pruning, cleaning, replacing old unproductive trees, and pest and disease management. Replacement of old trees is an urgent need, that entails several steps. It is important that replacement be done with the right variety,

[56] Though not geographically "south," Biombo is included in this group since it shares similar characteristics with the other three regions.
[57] TechnoServe Cashew Farmers Livelihood Program (Nigeria), 2017

one that has been properly selected to suit the production conditions of the region. Producers need support to properly understand this process.

The East: Bafata and Gabu

The East, which includes the regions of Bafata and Gabu, is home to the youngest orchards and new planting continues. For this reason, the average yield is low, varying from 250-350 kg/ha,[58] but is anticipated to increase as these plantations reach their full production age. The East differs from other areas within the country as it contains land with high a pH value and salt water. These lands are not suitable for production of other tree crops, but are suitable for cashew trees. This encourages cashew planting over other trees, though rainfall in this area limits production to only one peak per year, compared to three peaks in the North and South.

In the Gabu region, the majority of the population is Peuhl, people traditionally known as livestock herders. This area faces conflicts between arboriculture and pastoralism. The invasion of new orchards in Gabu by herds of animals causes the loss of a large number of young plants, either by trampling or by livestock's tendency to scratch against the plants, thereby breaking them. Some cashew plantations are difficult to distinguish as such, due to the small number of cashew trees that survive. This loss of seedlings limits productivity. Livestock can be a positive contribution to cashew farms, controlling weeds and fertilizing soils, but it takes five years for newly planted trees to reach the size where they are no longer vulnerable to cows. As they have only recently converted to cashew production, the plantations of these pastoralists in Gabu are the youngest in the country, some of which have not yet entered production.

7.4 RCN trade

Like elsewhere in the region, the value chain is dominated by the trade in raw nuts. This trade is led by exporters, who sell RCN to foreign processors.

As noted, Guinea-Bissau is the only country in the sub-region that imposes an export tax on RCN. Multiple other levies are also enforced. Taxes and levies are calculated on the basis of a "fixed base," a price that is set by the Government and does not vary during the agricultural campaign. An export price higher than this base is, therefore, a net gain for the exporter. Conversely, if the price obtained for export is lower than this fixed base, the exporter faces a net loss. RCN export is taxed by different entities. For illustrative purposes, the Table below outlines fees for exporting 1 MT of RCN in 2017. The fixed price/MT on which levies were calculated is US$1,150 - far below the market price – or, at an exchange rate of 588.75 CFA/US$, CFA 677,062.50.

[58] Interview with PRSPDA and other stakeholders in Guinea-Bissau, December 2017.

Table 5: Sample calculation of fees on 1 MT of RCN export

Type	Fee	CFA
Customs duty	6% (TIE)	40,624
	1.1% MOD	10.254
DGCI	Contribucao Predio Rustico (CPR)	15,000
	3% Adianmento Contribucao industrial (ACI)	20,332
CNC	32,400/container	1,968
	IGV 17%	335
ANCA	3,000CFA/MT	3,000
Total taxes on export of 1 MT of RCN in 2017		**91,512**
Port charges	Port charges	12,669
	VAT 17%	2,153
Forwarding agent	2000 CFA/MT	2,000
Port expenses		**16,822**

Guinea-Bissau's export tax can be viewed as a strategy to support local processing as well as farmers. The country produces enough RCN to think about larger, more encompassing value chain strategies. However, at the same time, Guinea-Bissau's cashew sector still requires significant capacity building and maintenance to maintain production volumes and growth.

In addition to its high taxes, Guinea-Bissau also has the highest freight as compared to all RCN exporting countries, which comes to around $100 per MT of RCN exported. This is due to port inefficiencies (discussed above), which cause long delays during the cashew export season that lead to a waiting fleet off the coast of Bissau. Likewise, trucks with containers filled with nuts also form long queues waiting for port access. Long wait times of up to two months have serious consequences for exporters. With bank rates at around 12 percent, this added time before export causes critical cash flow issues. Quality loss, market price fluctuations, or failure to meet contract deadlines are other consequences of long wait times. Moreover, in addition to taxes and royalties, traders are also subject to unpredictable road fees, otherwise known as road corruption. As with any intermediate cost between the farm gate and the port, it is ultimately the producers who bear these costs.

Beyond the problem of an inefficient port and irregular fees, exporters face the critical challenge of unavailability of bank financing. Around three to five years ago, established national export houses found themselves unable to liquidate their debts. This was caused by the intense volatility of prices at the time. Since then, banks have been very reluctant to loan to local exporters.

This lack of capital forced local exporters either to withdraw from the market or to accept subordination to foreign traders, who do have access to capital. Such subordination, or

dependency, is common: local exporters have even become service providers to foreign exporters, being remunerated by a minimal premium of around $10 per MT exported. This change has been facilitated not only by the political uncertainties of recent years, but also by the vagaries of the international nut trade, which are expected to continue due to intense RCN competition. Profits for local exporters are thus only a fraction of what they were a few years ago.

As a result of the shift toward the dominance of foreign exporters, changes in the exchange rate against the dollar during the RCN campaign can have a destabilizing effect. Inventories can also depreciate if world prices decrease - prices fixed by the Government are only indicative. One of the strengths of Indian importers lies in the fact that many of them recycle the CFA earned from importing rice to Guinea-Bissau (which can also be used to barter for raw nuts, as discussed above) to purchase RCN. This system further allows them to minimize losses from exchange rate fluctuations.

As noted, RCN is also exported through unofficial land channels to Senegal and Guinea-Conakry. Quantities vary strongly from year to year, since this route depends on smugglers who often make several trips by bike or motorbike on rural roads in order to evade taxation and export restrictions in Guinea-Bissau. In 2017, an estimated 15,000-20,000 MT was sent through the Casamance to the port of Banjul,[59] with an additional 8,000-10,000 sent to Guinea-Conakry. The latter channel is a recent development, evident in Guinea-Conakry's unusually large RCN export growth. Unregulated prices in Senegal, the Gambia, and Guinea-Conakry, mean cross-border trading is often more lucrative than in-country sales.

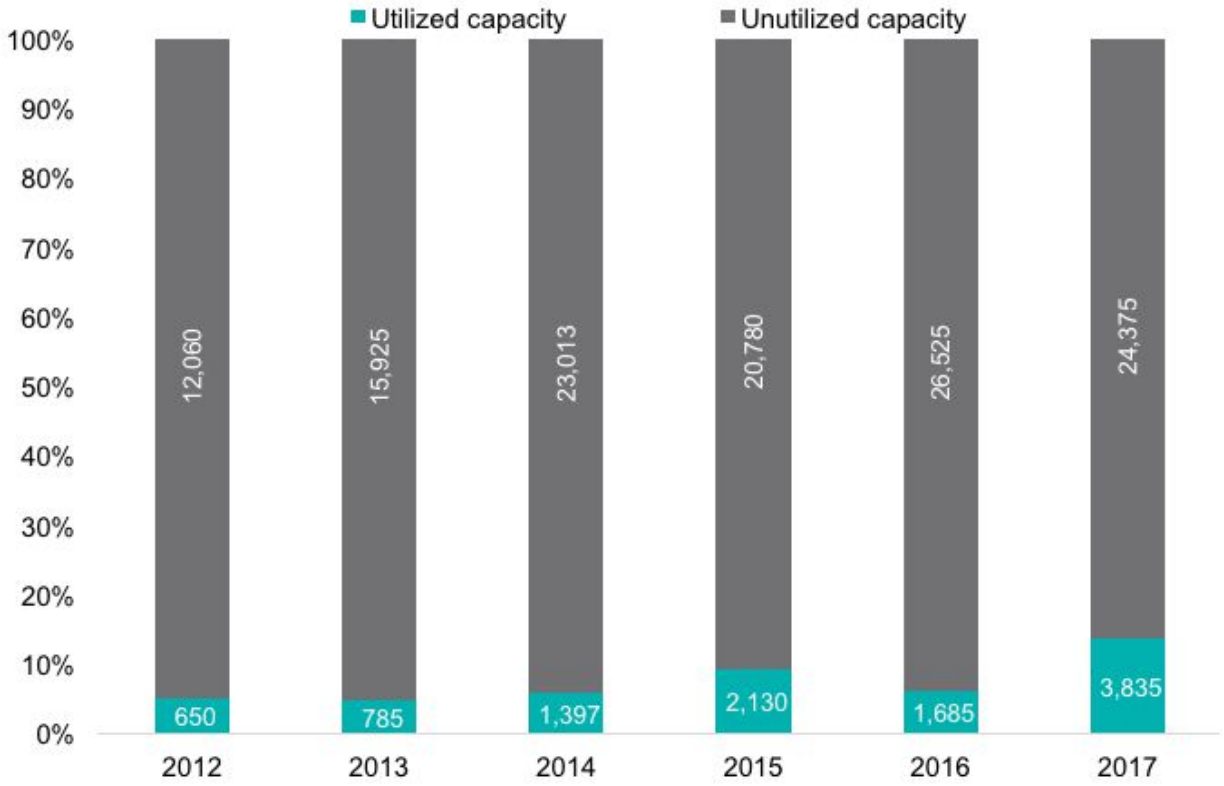
7.5 Processing

7.5.1 RCN processing

The history of cashew processing in Guinea-Bissau started with the Geta and AgriBissau factories and the small units of the TIPS project in the 1990s. These investments were followed by Sicaju and EnterpriseWorks/No Fiança after the war, and more recently, by the entry of several international investors. In 2017, the installed capacity of processing units is around 28,000 MT per year of raw nuts; the actual amount processed in 2017, however, was less than 4,000 MT. This represents less than two percent of national RCN production.

[59] RONGEAD estimation (N'kalô)

Exhibit 20: Utilized processing capacity in Guinea-Bissau, MT of RCN[60]



As seen from the exhibit above, domestic processing has historically remained at a very small proportion of installed capacity due to a variety of reasons outlined below. Although the overall situation is unsatisfactory, some processors are becoming profitable due to in-house technical capability and adequate financing. It is important to note that utilized capacity in Guinea-Bissau has gradually increased, rising from around five percent in 2012-2014 to nearly nine percent in 2015 and up to 14 percent in 2017. This trend demonstrates that if the right support is provided to processors, Guinea-Bissau can make notable progress in this sector.

Guinea-Bissau's cashew nut processing industry is currently composed of 12 export-scale factories and six small-scale processing plants (see Table below). Out of these processing plants, two large scale processing plants are technically operational, processing 3,500 MT of RCN for export markets. Seventeen other artisanal plants are processing 95 MT of RCN for local markets.

[60] Multiple primary and secondary sources aggregated by TechnoServe. The exhibt excludes very small artisanal processing plants that represent an insignificant share of overall national capacity

Table 4: Overview of current processors' capacity and constraints

Processor type	Processors	Available technology	Capacity utilization	2017 status
12 medium scale plants, all export oriented	• AMAN Bissau • Arrey Africa • West Africa Cashews • Gap Solutions SARL • LIACO (Lybios 1, 2 & 3) • Licaju • Sicaju • Investicaju • Investimento • Angolano • Agribissau	Majority are semi-mechanized, using Vietnamese mix or Brazilian technology	3,500 MT/ 27,470 MT (~14 percent utilization)	Two, Arrey Africa and West Africa Cashews, (of 12) are operational. The remaining 10 are shutdown, under construction, or in start-up phase.
6 small scale plants, (currently processing for local markets, in past some did exports)	• ANSIPER • Atlantico • CUCAJU • DJONDE • Quade e Quade • EMICOR	Semi-mechanized	95 MT/ 1,270 MT (~7 percent utilization)	At least Quade e Quade and EMICOR are semi-operational.
~17 micro scale plants, (Artisanal processing, only for local markets)	• Cooperativa Buwondena • Cooperativa Sabunhima • B&B Caju • At least 14 others	Varied technology	*Capacity unknown* (~10 percent utilization)	At least a few are operational, processing small quantities for local markets.

There are three new investors[61] who are working on plans to invest in cashew processing in Guinea-Bissau, but they are at a very preliminary stage. Recent investments have

[61] Paulo Gomes, Zaidan Ali and Vincent da Costa Blute

shown some momentum thanks to some preliminary success with Arrey Africa and West Africa Cashew. Nevertheless, these processers are still struggling to break even.

Spotlight on Arrey Africa

In December 2017, TechnoServe interviewed Arrey Africa. Overall, the processor was confident and optimistic about the existing business opportunity in Guinea-Bissau, provided appropriate policy interventions to support kernel exports and minimize predatory buying of RCN are undertaken. These processors highlighted the lack of good market information systems and direct linkages to farmers as critical constraints to their operations. Arrey Africa is keen on selling to U.S., European (Spain, the Netherlands, Russia), and the Middle East (Lebanon).

Arrey Africa adopted Brazilian technology, unlike other factories in West Africa which are using Asian technologies[1]. Arrey is self-financing and its production was limited in 2017 by its funds. With all available resources, the agribusiness managed to buy 1,000 MT of RCN. The owner would like additional funding to increase RCN purchases to 2,000 MT next year, but he has the same challenge obtaining financing from banks as other value chain actors have expressed. According to the owner, Orabank is the only financial institution in Guinea-Bissau who dares to invest little by little in the cashew sector. Last year, Arrey sourced some RCN from several intermediate traders in Cacheu and Oio and procured around 200 MT of RCN from three cooperatives KAFO, OPRO, and CAOJAQ.

From time to time, the Government and development agencies have taken various steps to support cashew processing, but all proved to be failures due to a limited understanding of cashew markets and basic business principles like financial sustainability. These efforts tended to focus on fairness and equity – funding several small processing plants throughout the country - rather than financial viability, which might instead require focusing on only a few processors who truly have the potential to be profitable businesses. Feasibility analyses are essential to understand whether a particular processer can be competitive once the project closes and the beneficiary must be self-sufficient. Without the prerequisite due diligence, the majority of the time, a wrong model or a wrong entrepreneur will be selected based on inappropriate selection criteria. The story of the Promotion Fund for the Industrialization of Agricultural Products (FUNPI) is illustrative of this point.

Using revenue generated from RCN export tax earnings, in 2011, the Government created the FUNPI to promote agro-industrialization. With a key goal being to shift Guinea-Bissau's cashew industry from one focused on the export of RCN to one focused on domestic processing, efforts included financing for cashew research, production, marketing, and processing activities. In addition to sectoral ministries, FUNPI also

supported banks and specialized institutions to provide credit instruments to relevant cashew value chain actors, including: credit lines, technical assistance, and guarantee funds to facilitate access to bank loans.

However, in the absence of rules governing the management and use of its resources, as well as transparent eligibility criteria, FUNPI's success was precluded by mismanagement. For example, FUNPI used a very small portion of its fund to finance automated processing equipment and RCN purchases for several ATC-Caju processors. However, these facilities that did not have sufficient scale, technology, or food safety measures in place in order to reach the quality and pricing necessary to compete in the global market. This led to closures after only a short period of time. FUNPI also supported CPC and a few cashew apple processors, such as EMICOR in Quinhamel, but no substantial or tangible impact resulted. Indeed, the audit mission of FUNPI concluded that it should be abolished and by 2015, FUNPI was closed.

In terms of gender equity, women are much more frequently in leading roles in processing than in production. Especially smaller processing units are often run by women's cooperatives, and even in larger ones it is primarily women that comprise the processing unit's workforce. In this way, the development of large-scale facilities that can provide substantial job creation could have a huge impact on increasing women's livelihoods in Guinea-Bissau.

7.5.2 Cashew by-product processing

Currently, a few small enterprises, mostly owned and operated by women, in Guinea-Bissau and the Casamance of Senegal produce cashew juice for the local consumer market, but the quantities processed are negligible. Apart from artisanal wine production, which is widely practiced in Guinea-Bissau by women, the processing of cashew apples remains a mostly social activity. It has been observed that there has been reduced production of cashew apple processing in recent past due to unavailability of inputs like glass bottles, gelatin, and financing.

EMICOR in Quinhamel can be considered an exception. EMICOR produces high-quality professionally bottled juice that benefits from a good distribution network through many commercial outlets. EMICOR has received several donations for RCN processing equipment, but the equipment for cashew apple processing is limited and simple (a manual bottle sealer and a metal drum designed for pasteurization and sterilization of bottles), without the added costs that could call into question profitability. In 2017, EMICOR sold 12,000 bottles of 30 cl at CFA 250 per bottle, with a margin of around 40 to 90 CFA per bottle, depending on whether bottles needed to be purchased. EMICOR's current model depends on the availability of empty beer bottles, which are recovered free-of-charge from local bars. A switch to a model based on the purchase of new bottles would result in a different profitability calculation.

There are currently no other processing operations focused on other cashew by-products.

7.5.3 Key processing challenges

In addition to the challenges of poor infrastructure and political instability discussed above, the key challenges to the Bissau-Guinean processing industry are outlined below. Of them, the most critical are:

Policy competitiveness

Indian and Vietnamese processors have a strong competitive advantage thanks to supportive domestic policies and decades of experience in the industry (see above Section 5.3). This gives them a huge leg-up over Bissau-Guinean processors, enabling them to easily exploit the RCN trade to their benefit. This type of predatory buying of RCN drives up prices for domestic processors, who are then unable to purchase RCN due to lack of capital and aversion to the high up-front cost. In addition to the lost revenue, when processing equipment sits unused, it degrades faster.

Lack of technical 'know-how'

The majority of plant owners lack in-depth prior experience or training in processing or business management, which has led to disastrous errors. Indeed, many attribute their failures to uninformed investment decisions, limited technical knowledge, ad hoc selection of technologies without knowing their true needs and application, unrealistic business projections and operational solutions, and inappropriate factory layouts. Uninformed on potential returns due to a limited ability to conduct financial analyses, processors may be reluctant to afford the huge RCN procurement cost. In addition, processors that target the local market have different requirements than those targeting export markets, which should result in different processing models. Export-oriented processors lack knowledge about measures necessary to access international markets, such as food safety regulations, traceability documentation, and environmental and social management.

Additionally, workers have historically received little training, resulting in inefficiency across processes and overall low productivity. This has also led to processing loss both in terms of yields and quality. These issues are exacerbated by the fact that processors have effectively no access to reliable technical advice and support.

Weak market linkages

Limited upstream and downstream market linkages also cause inefficiencies. Currently, there are no formalized producer-processor relations, resulting in higher procurement costs (due to high intermediary commissions and defaults on advances given to farmers or traders for cashews) and no traceability of supply (a key value-addition in the global market).

Lack of access to affordable finance

Currently, there are only about four or five banks present in Guinea-Bissau, resulting in very limited branch penetration beyond the capital Bissau. This makes it hard to obtain working capital loans at reasonable terms and conditions. Currently, processors are challenged with very high interest rates, under financing, and non-availability of timely loans. Bissau-Guinean processors have also been unable to attract adequate equity financing.

Unfavorable kernel policies

Guinea-Bissau is currently the only country in the world to have a tax on the kernel exports. Under this system, processors are required to pay this tax, which includes: three percent ACI (Adiantamento Contribucao Industrial), one percent of customs fee (Emolumentos Alfandegas), and 15 CFA/kg of kernel exported as CPR (Contribucao Predio Rustico). In reality, the ACI tax is a tax on industrial exploitation (income tax) rather than an export tax, but it is collected at the time of export. A more appropriate process would have it collected on declared profits. These fees increase costs for processors, damaging their competitiveness on the international market.

7.6 Market linkages

7.6.1 Upstream linkages

Direct and formalized producer-processor linkages in Guinea-Bissau are very weak due to the lack of farmer organization. The majority of farmers are smallholders who produce only small quantities. RCN serves as a sort of savings mechanism, giving producers access to cash when they need it, but serving as in relatively secure asset until then. In this way, producers often sell several times during harvest to meet their day-to-day needs. This also allows them to be opportunistic in terms of RCN prices. However, as a consequence, without aggregation, it is uneconomical for processors to buy directly from smallholder farmers.

Nevertheless, the recent work of PRSPDA on farmer linkages with one processor proved to be a considerable success. Though the original goal was 1,000 MT, in 2017, one processor successfully sourced 200 MT from three cooperatives. Though a lower price was noted on the contract, it ended up reaching 775 CFA/kg on an average at factory gate by this direct linkage. This resulted in a win-win situation for both the processor as well as the farmers.

7.6.2 Downstream linkages

Guinea-Bissau's national processing sector is in its infancy and still has major gaps to address in order to satisfy market requirements on product quality and food safety compliance—these are key bottlenecks to effective downstream linkages that are currently missing in the Guinea-Bissau cashew value chain. However, once these requirements are met, markets are very supportive and companies like Global Trading &

Agency, Intersnack for the EU, and Red River Foods and Caro-Nut for the United States, are very committed to developing their cashew kernel sourcing in West Africa. These companies are therefore potentially ready to buy all processed kernel in West Africa as long as it meets the minimum standards of food safety (HACCP, BRC, etc.). Currently, they have never bought kernel in Guinea-Bissau, though they may have visited the country in preliminary scoping visits.

In an interview, a Caro-Nut representative explained that she informed West Africa Cashews and Arrey Africa that their quality is satisfactory. She also indicated that they will soon place an order for U.S. markets. Currently Guinea-Bissau sells kernels to different markets like Spain, Brazil, U.S., the Netherlands, Russia, and the Middle East. As quantities grow, processors are looking for new buyers. In general, Guinea-Bissau is not yet known for its cashew kernel quality. The utmost care is required to address this issue effectively. Food safety and traceability should be an integral part of Guinea-Bissau's processing strategy if it is to secure reliable downstream linkages.

7.7 Kernel markets

Though no official statistics are available on current or historical kernel consumption in Guinea-Bissau, amounts are negligible at not more than a few hundred kilograms per year.[62] Kernels found in domestic markets are generally of poor quality, as they are processed by small and artisanal facilities in the informal sector, who do not follow any international food and safety standards. In general, the local market for cashew products is poorly structured and poorly organized.

Domestic kernel prices are also hard to determine. However, using a "rule-of-thumb" assumption, domestic prices tend to be 15-20 percent higher than international prices due to high costs and other processing inefficiencies. Kernels are typically sold by street vendors located on key shopping roads and crossroads of Bissau. Research for this study conducted in different markets in Bissau and its outskirts revealed that prices generally ranged from $10.50–12 per kg (CFA 6,000-8,000). Vendors expressed a belief that there is an unsatisfied demand resulting from high prices. Local markets noted inconsistent quality and supplies over the last two years.

In terms of cashew apple products, the majority are sold in domestic markets. Bissau markets could see a considerable demand for cashew apple juice if it were professionally packaged with uniform quality and proper food safety compliance. Indeed, it is estimated that, all other conditions remaining same, a well dedicated marketing campaign to spread awareness about the product could significantly boost cashew apple juice consumption

[62] Based on data collected in December 2017. Since local markets are supplied entirely by artisans, micro-enterprises, and a few small and medium-sized processors, supply must be equal to domestic consumption. These actors currently produce a few hundred kilos per year.

over 500,000 bottles (33cl) per annum. Current supply, however, is very limited and inconsistent.

At the moment, only Arrey Africa and West Africa Cashew, who produced a total of 3,500 MT in 2017, process for the export markets of the Middle East, the Netherlands, Spain, France, U.S., Russia, Brazil, and Turkey. However, high dependency on Vietnamese kernels means global markets are looking for any possible supplies that meet the quality specifications and food safety standards.

8 Senegal value chain analysis

Senegal is a West African country of 196,722 square kilometers with a population of 14.7 million, the largest of the three countries reviewed in this report. Most of the country lies in the Sahel region, characterized by irregular rainfall and poor soils. Principal economic activities include mining, construction, tourism, and fisheries and agriculture. Top exports include oil, phosphates, gold, fish, and groundnuts. Foreign aid, foreign direct investment, and remittances are also essential to the economy. In addition to being the largest, Senegal is also the most attractive country for investment in the SeGaBi sub-region. After more than a decade of modest growth, GDP has been expanding at rates of at least six percent since 2015.[63] Political stability, infrastructure investments, and economic reforms implemented under the 2014 Emerging Senegal Plan have been important factors behind this growth.

Rising agricultural production has also been a key driver of this growth, thanks to high rainfall in recent years and increasing productivity. The agricultural sector accounts for around 70 percent of employment[64], contributing about 17 percent to GDP.[65] The main subsistence crops include rice, millet, sorghum, and maize, while key cash crops are groundnuts, cotton, and sugarcane.

Cashew has only recently taken on a greater importance in Senegal, with RCN production having doubled to around 35,000 MT in 2017. Despite the strong growth in raw nut supply and sound value chain infrastructure (including access to efficient port facilities in Banjul and Dakar), Senegal still lacks industrial-scale cashew processing. Most production is, therefore, exported raw through the port of Banjul in the Gambia. A favorable sector context, however, means the current state of affairs is ripe for change.

Senegal is well-known for both its political and economic stability. Institutions and the rule-of-law are strong. As one of the three fastest growing economies in Africa, macroeconomic performance in recent years has been similarly strong. Its economy is considered to be open, with several trade agreements that provide preferential market access, including bilateral agreements with the U.S. and China. This represents a favorable setting for foreign direct investment, which can be a strong force for the development of domestic cashew processing.

Generous public spending on infrastructure of nearly a billion dollars a year has led to significant improvements in recent years. Increased energy generation has dramatically reduced electricity cuts from 912 hours in 2011 to 72 hours in 2016. In the last four years, 1,520km of new roads have been built, with an additional 4,015km rehabilitated.[66] These

[63] CIA, 2018 (“Senegal")
[64] Advameg, N.D.
[65] CIA, 2018 (“Senegal")
[66] Deloitte, 2017

investments have facilitated cashew value chain logistics, thus supporting the sector's growth. Nevertheless, there is still much work to be done to improve Senegal's logistical context, especially in the Casamance.

In the past, the geographic disconnect from the rest of the country and the enduring conflict in the Casamance led to weak infrastructure and inefficient roads that negatively impacted farmers' ability to market their harvest. Since relative calm has returned to the region, efforts to enhance the region's infrastructure have had a strong positive impact on the local economy. The only national road linking the Casamance to the rest of Senegal, RN6 connects the Port of Ziguinchor to Tambacounda in Eastern Senegal. The Millennium Challenge Corporation's recent rehabilitation of the road, which finished in 2015, has thus facilitated the movement of local agricultural products both within the Casamance and outward toward the rest of Senegal. The impact of this project was further enhanced by the USDA-funded road rehabilitation project, implemented by SFL. By rehabilitating 130 km of key feeder roads extending off of RN6, from Ziguinchor to Samine in the Sedhiou region, the movement of goods in surrounding communities has been dramatically improved. Many feeder roads further east, however, are still in need of rehabilitation. Also of note is the World Bank's Casamance Development Pole Project, which is currently rehabilitating 480 km of roads in the Ziguinchor, Sedhiou, and Kolda regions. The project is expected to close in June 2019.

Senegal is the financing hub for the SeGaBi region. The country enjoys a dynamic microfinance sector: large microfinance institutions (MFIs) are sound and profitable, but smaller ones are fragile and supervision of the sector calls for strengthening. In recent years, financial depth increased. Credit to the economy is now at almost 30 percent[67] of the GDP, higher than in most ECOWAS countries. However, credit remains largely short-term and directed mainly to trade, food, and oil imports. There are currently more than 23 commercial banks, mostly operating in the three largest Senegalese cities and accounting for about 90 percent of the financial system. There are some social financial institutions taking initiatives to participate in sector financing, such as Root Capital and MCE Social Capital. These pioneers have supported a few processors in the region. Root Capital is headquartered in Dakar.

8.1 Value chain overview

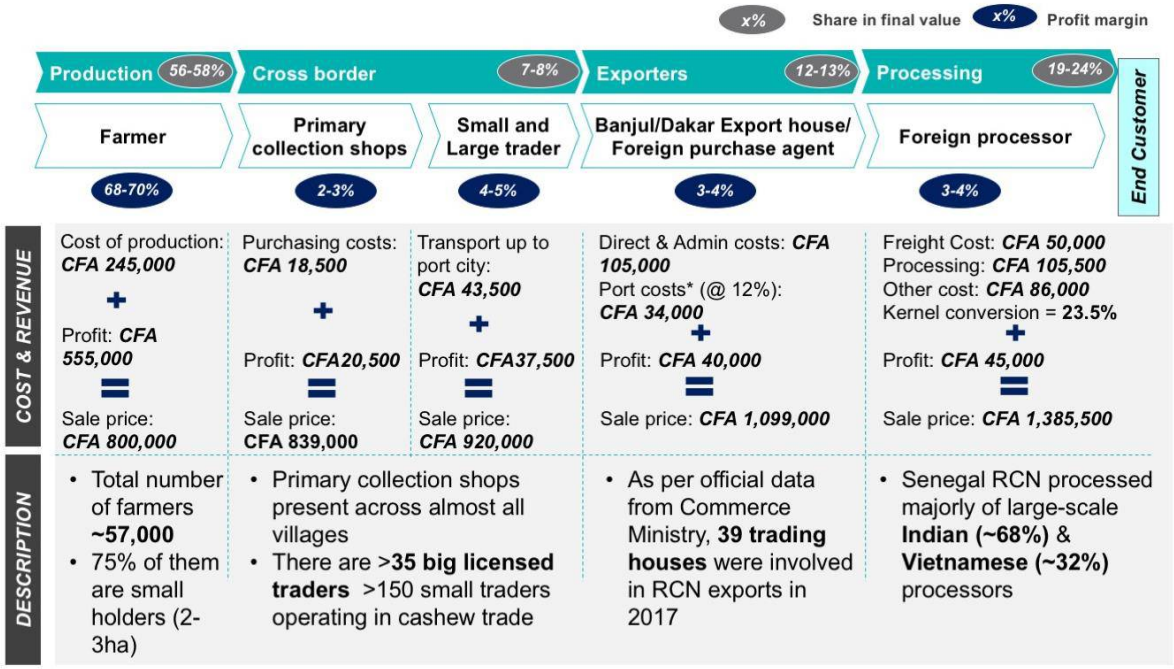
Despite the highly favorable context, like other African countries, Senegal relies significantly on RCN exports for sale of its RCN production. As there are hardly any laws that guide the behavior of sector actors, the Senegalese cashew market has minimal integration into global market. As seen below, internal export logistics and intermediary commissions account for around 35 percent of overall value at factory gate. If nuts were processed locally, this lost value-addition could result in significant financial gains for the Senegalese economy. Unfortunately, the current state of local processing is cost

[67] MFW4A, 2018

inefficient, faced with various operational risks. The overall weakness of the domestic value chain is attributed primarily to minimal sectoral knowledge, weak organization, a predatory RCN trade, inadequate access to market information, and underdevelopment of by-product processing.

The current cashew value chain in Senegal is fairly long for a country its size. Given the lack of strong farmer cooperatives and targeted government regulation, multiple traders operate within the chain having the capacity to influence and alter trade dynamics to suit their needs. Because nearly all production is destined for export rather than domestic processing, this analysis is focused on foreign processing.

Exhibit 21: Current cashew supply chain margins in Senegal (1 MT of RCN), 2017[68]



As presented in the exhibit above, the Senegalese cashew value chain generally constitutes 4-5 actors, with 3-4 intermediaries between the farmer and foreign processor. The role of each stakeholder is varied and is explained below.

Producers

There are an estimated 57,000 cashew farmers in Senegal[69]. The typical farmer earns approximately CFA 555,000 per MT of RCN, having a 58-60 percent share in the final

[68] Figures presented in this exhibit and discussed in the text that follows are drawn from TechnoServe analysis based on multiple primary and secondary sources.

[69] Rabany, Ricau, and Rullier, 2015 (p.26) estimates there to be 170,000 ha under cultivation. If the average farm size is 3 ha, then there are around 57,000 cashew producers.

market value, with considerable potential to increase income. Due to weak farmer organization and high dependency on RCN revenues, most farmers sell individually to traders that come directly to their plantations in search of nuts. Lack of knowledge pertaining to nut quality, very little farmer aggregation, and weak market linkages currently inhibit producers' ability to gain a larger share of value-addition.

Traders

Generally, there are 2-3 levels of traders between the farmer and exporter, depending on the distance to the nearest port. Small- and mid-sized traders tend to be local residents who are often current or former cashew producers. These local collectors sell to larger traders (Senegalese and Mauritanians) who have formal relationships with exporters and who provide working capital for a specified quantity of RCN. Costs typically covered by traders include transportation and loading fees, as well as costs associated with weight loss resulting from nut drying. Typically, traders do not formally measure nut quality at the time of purchase, as they are often pressed for time in a highly competitive market. This means they also do not offer a premium for a higher quality nut. There are more than 39 larger traders in the Ziguinchor region alone[70]. Added together, individual traders earn hefty commissions and collectively have a 7-9 percent share in the final market value.

Exporters

Based in Banjul or Dakar, this group generally consists of domestic export houses and purchasing agents of international trade groups and processors. Since nearly all domestic RCN production is exported to foreign processors, exporters occupy a critical role within the supply chain. They earn about CFA 45,000-50,000 per MT of RCN, capturing approximately 14 percent of the share in final value. Exporters also tend to incur a variety of costs, including pre-financing traders (and costs associated with defaults), warehousing and storage, RCN cleaning and packaging, and FOB expenses (customs, taxes, port fees, certifications, freight). There are 53 active exporters in Senegal who work closely in Senegal as well as in Gambia.

Foreign processors

The final destination of raw cashew nuts is foreign processors, who are primarily Indian (68 percent of RCN exports) and Vietnamese (32 percent of RCN exports).[71] Senegalese nuts have a bit lower yield realization as compared to Bissau-Guinean nuts and thus result in lower revenue realization.[72] However, import processors still realize around 23.5 percent of kernel yield, earning a profit around CFA 45,000 per MT of RCN (3-4 percent).

[70] Interview with a trader in Ziguinchor, December 2017; Gomez, Jaeger, and Peters, 2011 (p.18) found there to be around 53 larger traders in the wider Casamance region.
[71] UN, 2016
[72] Though Bissau-Guinean RCN mix to some extent with local Senegalese RCN, exporters check for quality at the time of delivery and pay accordingly.

Estimated value chain demand for finance

The total estimated demand for finance over the next six years for all relevant value chain actors is US$26m. Financing is not estimated for traders and producers in 2018 as it is assumed that some time is needed to establish relationships and sensitize these groups.

Table 6: Estimated Senegalese cashew sector financing need, 2018-2023 (US$, thousands)[73]

	2018	2019	2020	2021	2022	2023
Processing	$614	$1,787	$2,887	$4,056	$5,275	$6,839
Trading	$-	$368	$589	$662	$736	$810
Production	$-	$113	$150	$225	$255	$315
TOTAL	**$614**	**$2,268**	**$3,626**	**$4,943**	**$6,266**	**$7,964**

8.2 Sector organizations

Given the sector's relative youth and minor role in the economy, few sector organizations currently exist in Senegal. Many groups that do exist were created for opportunistic reasons (such as to benefit from a project), rather than for self-motivated purposes. There are not any current regulatory bodies charged with the sector.

By and large, producers at the grassroots level are not well organized. Interviews suggested the existence of some cooperatives, but this is not widespread.

PADEC has put forth considerable effort to create a cashew trade association. To that end, PADEC formed a national steering committee consisting of the Ministries of Agriculture, the Environment, and Commerce, the Senegalese Agricultural Research Institute (ISRA), as well as relevant NGOs and donor projects. From this, an umbrella structure was planned. The idea was to have four *colleges* for each of the man stakeholder groups: producers, processors, local traders, and exporters. Each of these *colleges* were to be organized under regional trade associations, which would all be under an umbrella national trade association. This formalization process was still underway at the time of research conducted for this report, and it is unclear whether the impetus for that process will continue once PADEC closes in early 2018. All of the groups listed here were known to be active in 2017; groups that were not confirmed are not listed.

***Coopératives Agroalimentaires de la Casamance* (CAC)-Sedhiou**

CAC-Sedhiou is a group of 17 small RCN and apple processors (GIEs) that was created in 2014 with the support of PADEC. The objective of the group is to promote agribusiness through the professionalization and specialization of group members. In short, the idea was to facilitate marketing of the processors' products locally and internationally. For example, PADEC helped CAC to set up a boutique in Parc de Hann in Dakar, where

[73] TechnoServe analysis. See Annex 12.4 on the assumptions and calculation.

members' products are sold. Only 11 of the 17 processors were active in 2016 with very limited capacity. There is also a CAC-Kolda and a CAC-Ziguinchor, though these groups focus on honey and fruit, respectively.

***Cadres Régionaux de Concertation des Opérateurs de l'Anacarde* (CRCOA)**
Created in 2012, each of the key cashew producing regions in the Casamance has a CRCOA: Ziguinchor, Sedhiou, and Kolda. These groups are meant to cover all cashew value chain actors, grouping together the four *colleges* mentioned above. It is unclear whether there are plans to make a CRCOA for the Fatick or Thiès regions – where PADEC did not work - as well. The three CRCOA in the Casamance are active, but their capacities seem to vary. For example, CRCOA-Kolda and CRCOA-Sedhiou were able to provide production estimations but CRCOA-Ziguinchor could not.

***Cadre de Concertation des Opérateurs de la Filière Anacarde de la Casamance* (COFAC)**
Also created in 2012, the *Cadre de Concertation des Opérateurs de la Filière Anacarde de la Casamance* (COFAC) oversees the three Casamance CRCOA and seeks to expand as the *Cadre de Concertation des Opérateurs de la Filière Anacarde du Sénégal (*COFAS) to cover all of Senegal. At present, the producers are too poorly organized to properly represent themselves alongside the powerful raw nut traders, and the processing industry is still in its infancy. COFAC is currently being restructured by the national steering committee mentioned above. Limited government engagement in and support for COFAC, combined with unequal member representation, means the group has had little success in bringing formal organization to the Senegalese cashew industry.

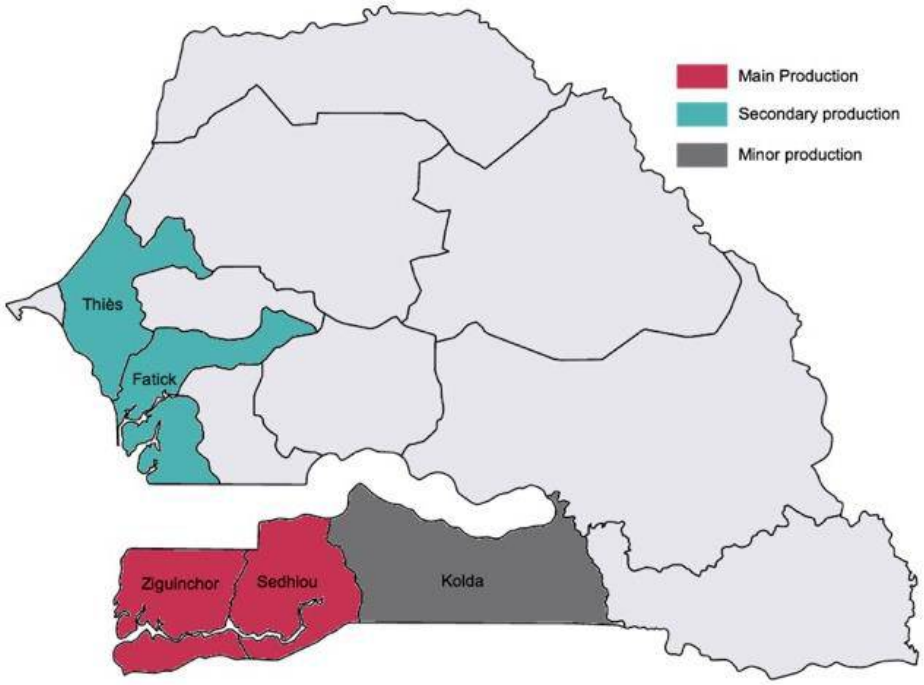
8.3 Production[74]

Although the Environment Ministry has promoted cashew for reforestation and soil stabilization for over 30 years, cashew is a relatively new force in Senegalese agriculture. Production originates in the late 1930s, when cashew was introduced by the colonial government for its nutritional value. Production remained limited until the 1970s and 1980s, when cashews farmers fled to the Casamance from Guinea-Bissau, and began production there. Cashew production remains concentrated along the border, in the regions of Ziguinchor, Sedhiou, and Kolda, where farmers have benefitted from success stories, planting material, and general knowledge from Guinea-Bissau. As the oldest cashew-producing regions, plantations in these regions tend to be the densest. Outside of the Casamance, cashew is cultivated in the Fatick region, primarily around Sokone just north of the Gambia, and in the Thiès region, in the Tivaoune department. Production in these central regions was initiated by donors in the 1980s and 1990s.[75] North of the

[74] It is important to emphasize that the relative youth of the cashew industry in Senegal, along with significant RCN inflows from Guinea Bissau, mean it is difficult to obtain reliable data on production: the government does not collect official data, few technical studies have been conducted, and the national and regional organizations that exist are only beginning to coordinate the collection of such statistics.
[75] Gomez, Jaeger, and Peters, 2011, p.12

Casamance River and in the Sine Saloum region north of the Gambia, large tracts of unexploited land are still available.

Exhibit 22: Cashew production zones in Senegal



National levels of production started increasing at a more dramatic pace in the early 2000s. By 2015, the total area under cashew production was estimated to be 170,000 ha (less than one percent of Senegalese territory) of which 125,000 ha were productive[76]. Most production is done by smallholders, but the average farm size is unclear; it is likely not more than three hectares. Farms tend to be larger in the Ziguinchor and Sedhiou regions and smaller in Fatick and Kolda. Unlike Guinea-Bissau, plantations are relatively young, with most established less than 20 years ago. Average yields across the country are estimated to be around 376 kg/ha.[77] While regional level data is not available, research suggests yields to be highest in Fatick and lowest in Kolda.[78] The basic seed variety is good, producing a high-quality nut with outturn rates of 50 to 52, with higher quality coming from Fatick, followed by Ziguinchor and Sedhiou, and finally Kolda.

[76] "Rabany, Ricau, and Rullier, 2015, p.26
[77] Ibid.
[78] Interviews conducted in the Casamance, December 2017;

Table 7: Estimated Senegalese cashew nut production, by region (MT)[79]

Region	2011	2012	2013	2014	2015	2016	2017
Fatick	1,000	1,100	1,300	1,500	1,400	1,450	1,600
Thiès	850	700	900	1,000	1,100	1,100	1,100
Casamance	26,000	28,500	29,000	31,000	32,500	33,000	36,000
Total	**27,850**	**30,300**	**31,200**	**33,500**	**35,000**	**35,550**	**38,700**

RCN production has grown significantly over the past decade. In 2007, RCN production was estimated at 17,000 MT and in 2017, estimates are between 32,000-38,500 MT, representing up to a 10 percent CAGR. Some reports claim that production is as high as 45,000 MT. One major driver for this growth is diversification from key historical cash crops like groundnuts, which not only require more effort to produce, but also are less profitable than cashew. Another notable factor is market developments—since 2010, cashew demand has been rapidly increasing and along with it, market prices have also risen (from CFA 350 in 2007 to CFA 1,100 in 2017).

In all regions, Senegalese farmers are investing in cashew production and creating new plantations. Moreover, recent price trends have encouraged producers to think more about how to boost yield as well as quality. Overall, farmers have greater confidence in the promise of cashew cultivation, thanks to its strong income generating opportunity. Many employ more traditional, low-input, low-effort techniques, although some farmers do purchase nursery-raised seedlings and use improved agronomic practices. Plantations are typically inter-cropped with traditional short-cycle crops such as groundnuts, maize, and millet until the cashew canopy matures. Senegalese farmers are currently motivated and ready to learn and apply the appropriate techniques—representing an enormous opportunity to improve production and ultimately incomes of farmers and their families. In the Casamance, new planting efforts have been supported by projects such as the Canadian-funded PADEC, USDA-funded CEP (1 and 2) and the government *Direction des Eaux, Forêts, et Chasses,* which operates nurseries. The *Fédération des Associations qui Agissent pour une Meilleure Vie dans les Villages* (FAMVI) based in Simbandi, even contracts to provide training in cashew seedling production and grafting, as well as produces seedlings itself.[80]

Like most parts of West Africa, in Senegal, cashew cultivation is dominated by the men who control land access. Only in Kolda is there a larger minority of female cashew producers. It is otherwise rare to come across women who own a cashew plantation. This is because most Senegalese come to own their land through inheritance. Because women move in with their husband's family when they marry, parents are reluctant to give them much, if any, land. Once married, a woman will depend on her husband to access land, and his approval to cultivate cashew. In areas that have more available land, such

[79] TechnoServe analysis based on multiple primary and secondary resources.
[80] Interviews carried out in Simbandi, November 11, 2016

as in Kolda, women who are willing to cultivate the land (with whatever crop) are allowed to do so. If land is scarcer, however, it can be very difficult for a woman to gain access to her own land. Nevertheless, women and children play a large role in working the land and harvesting the RCN.

In general, Senegalese cashew cultivation is almost entirely organic. At present, there is hardly any chemical or inputs used in Senegal to grow cashews. By using best agriculture practices in new plantations, it is possible to dramatically reduce the future need for chemical treatment against pests and diseases. This is different from Guinea-Bissau, where many plantations are already matured, planted too densely to avoid the future use of such treatments. Moreover, the kernel export tax there would erode the organic premium, whereas in Senegal this is not an issue. This opens the door for a big opportunity of going organic, a rapidly growing market segment with great market premiums and a sustainable growth in the future. Although most Senegalese producers already use organic and socially equitable production practices, many cannot afford the high cost of certification required by many foreign markets – around $6,000-7,500 on average[81]. Certified Organic markets are growing fast with premiums 20-25 percent higher than conventional market price. With the right intervention strategy, the Senegalese cashew sector could become one of the most competitive in organic cashew.

8.3.1 Key production challenges

A variety of challenges impact cashew nut production in Senegal. These are summarized in the section below.

Research and development

Like the rest of the SeGaBi region, there is a strong need to conduct additional research to identify, develop, and propagate improved cashew varieties appropriate for the production zones within Senegal. Since cashew production has only recently taken off in Senegal, very little research has been done to-date. Senegal already proves to have some good varieties, which can be identified with a right selection protocol in place. Thanks to support from CEP 2, ISRA completed a study in 2013[82] to identify and characterize cashew varieties in Senegal and the Gambia: in total, there were determined to be 12 varieties, of which five were selected as the highest performing. While this serves as a good foundation, the timing of the study (May/June) was suboptimal, making it difficult to collect sufficient sample sizes. The report itself recommended additional research be conducted during a more optimal time of the cashew campaign (between February and April), when both nuts and cashew apples are more widely available. Unfortunately, now that the project has closed, ongoing efforts are limited. High-yielding varieties should then be replicated through grafting techniques.

[81] Estimation provided by an ECOCERT consultant, January 2017.
[82] IRD and ISRA, 2013

Good agronomic practices

Most cashew producers have received some training on good agronomic practices. Still, application of these practices is modest at best, and with more farmers taking up cashew cultivation, the need for training and capacity building is growing.

Historically, spacing has been a big part of training programs, and in all regions except Kolda a majority of farmers are said to be applying what they learned in their new plantations. In Sokone, the availability of land is a limitation to proper spacing. Older plantations everywhere are characterized by high tree densities. Intercropping with groundnuts, maize, and millet is often practiced in young plantations.

Farmers prune their trees, but primarily for firewood rather than maintenance. The practice of cutting trees for firewood is not appropriate as it leaves trees open for pest attacks like stem borer (though this has not been observed in the field yet). Producers also noted a lack of tools to practice effective pruning techniques. Family or laborers are accustomed to clearing land, but more could be done. In Sokone, interviews underlined the problem of cashew apples left to decay in fields, which attracts insects that hurt the cashew trees. Given the near absence of a market for cashew apples in Senegal, this is likely a problem everywhere.

It is important to emphasize that while practices can be improved everywhere, the need and potential for improvement is much greater in the Kolda region. As a newer cashew production zone, only a minority of farmers have received formal training, and even a smaller minority apply the training they received. Higher rates of poverty also mean that any improvement in practices, and therefore RCN production, could have a strong positive impact on the local economy.

Pests, disease, and climactic conditions

At present, there are no major pest or disease challenges. The Casamance belt has some mild pest attacks. Farmers generally do not treat their trees or take precautionary measures, so as a result, some farmers in this region have noted partial losses in their crop. Some farmers are aware of the issue of pest attacks, but are not able to identify the pest or apply an accurate treatment. Pest and disease management is not a priority of the region as according to farmers, damages have been minimal to date. There is, however, a need to do some thorough work on the assessment of the full impact of pests and diseases to identify its place in current and future production technical packages.

Producers noted issues with various insects, such as red ants and crickets, attacking their cashew nuts. For red ants, farmers inaccurately perceive their presence as harmful. However, red ants do not actually damage the crop, rather they support pollination and fight against pest attacks. As for diseases, several farmers in the Casamance talked about a disease that delays fruit development, though they did not know the name. More work is required to investigate this potential disease further.

In Sokone many farmers complained about diseases that affect older trees, and gummosis is a small nuisance throughout. Gummosis is a stem borer that infects old stems and stem holes (pruned area, not properly treated). Stem borer infection multiplies fast in old and abandoned plantations and results in a considerable loss of production, with severe attacks leading the plant to die. Heat, along with dust from the Harmattan winds, affects all regions, drying out flowers. In Kolda, brush fires were also noted as a problem.

Harvest and post-harvest practices

Cashew nuts are often the principle source of income for farmers. The poorest farmers, who are the most dependent on these revenues, therefore seek to sell their harvest as soon as possible. This leads to premature harvest and inadequate drying. Drying both requires time, and reduces the overall weight of the nut, which is the primary factor in determining payment, since most RCN collectors do not focus on quality.

Proper storage is another difficulty, mostly due to a lack of warehousing. This is especially problematic during the rainy season, as rain-damaged nuts are of much lower quality. While these issues are present everywhere, they are worse in Sokone and especially in Kolda, the poorer and more resource-scarce areas of the four regions covered in this report. With proper harvest and post-harvest handling, neat and clean cashew apple detachment techniques, proper drying, utilization of jute bags, and access to transit warehousing, Senegal can improve its outturn rate by a minimum of two lbs. quality, or additional value equivalent to $75-80 per MT of RCN.

Planting by seed, not grafted seedlings

Planting by seed delays production startup. Technically, if a farmer plants from a seed, production should start in the third year and reach its peak in years 9-10 whereas grafted plants start producing in the second year and achieve peaks in years 7-8. In all regions, the majority of producers continue to plant directly using their own nuts. Nuts are selected as seeds by looking at a tree's yield and gestation period. In general, producers lack both the knowledge and the tools to assess kernel quality, so this is not considered, though kernel outturn is one of the most important factors for seed selection.

Some nurseries exist and sell seedlings, with a wide variation in terms of the attention nursery managers' pay to variety or seed quality. In Sokone, nurseries do not provide any information on seedling quality. On the other hand, farmers in Sedhiou reported that nurseries were beginning to focus more on quality by cultivating seedlings from nut varieties that they brought from elsewhere. Grafting is practiced by some (it was taught by CEP), but is not widespread. Grafting is a difficult skill to acquire and is compounded by the fact that demand for high-quality grafted seedlings is weak, as few farmers seem to appreciate the added value of seedlings enough to justify the additional expense. One nursery in Ziguinchor produced and sold 2,000 seedlings in 2017 with some degree of

grafting. Timing was also noted as a challenge in Sokone, with seedlings arriving to markets too late in the rainy season to be planted. This is due in part to negligence on the part of nursery managers, who are often managing multiple economic activities, as well as a lack of materials. In fact, difficulty finding the thick black plastic bags used to grow seedlings was cited everywhere. In general, nursery managers need more support to better understand the importance of focusing on variety choice, but they will only be motivated to do so if this is important to their target market: producers.

Access to technical assistance and extension services

In general, Senegalese farmers lack access to an informed, reliable source of advisory services. Extension services are provided by various government offices, most notably the *Agence Nationale de Conseil Agricole et Rural* (ANCAR) and the *Centre National de Formation des Techniciens des Eaux, Forêts, Chasses et des Parcs Nationaux* (CNFTEFCPN) in Djibélor, run by the *Direction des Eaux et Forêts, Chasses et de la Conservation des Sols* (DEFCCS). However, agents do not receive specific training on cashew production, and therefore do not serve as a reliable source of advice for cashew producers. CEP supported CNFTEFCPN to create a test site for agronomic practices, a seed plantation, and a grafted seedling nursery. The government does not provide funding to support these activities post-CEP, but the Director continues to work the sites to the extent possible. In 2017, they were able to produce 300 grafted seedlings that they donated to farmers. Such scale is negligible. For comparison, Mozambique's 85 small nurseries produce over 600,000 grafted seedlings each year.[83]

Aside from these extension services, the few functional cooperatives that exist also provide a degree of technical support and collaboration for smallholders. CEP also established farmer field schools (*champs-écoles)*, but interviews suggested that there was not sufficient follow-up to ensure a solid knowledge base within these schools and they do not currently play a large role in providing technical support to farmers.

Ultimately, extension services in Senegal are very donor driven. There is also a lack of collaboration and knowledge incubation among the services that exist. There are and have been various projects engaged in the sector that are addressing certain issues, however, a lack of collaboration and/or insufficient handover at the end of projects has resulted in the initiatives ending as the projects end. The sector would strongly benefit from strategic organization and coordination of the different initiatives, to install systems to incubate learnings as well as serve as knowledge management platforms.

Theft and livestock grazing

Cashew plantations, like most other fields, are rarely secured by fencing. As a result, producers face high losses from theft and animal intrusion. This is a complex issue to address, rooted in two key drivers. First, livestock owners allow their animals to roam

[83] TechnoServe's MozaCaju project database, 2017

freely for grazing, since they would otherwise need to provide feed if animals were secured. The general logic is that as long as your neighbor's cows are feeding on your vegetation, there is little incentive to stop your cows from feeding on their vegetation. Such grazing can devastate young orchards. Second, labor to maintain and harvest the plantation is most frequently done by family, who are not formally compensated. They therefore compensate themselves (especially adolescents) by "stealing" nuts. In addition, when demand is as high as it has been in recent years, it is very easy to find a buyer. Theft thus comes with little risk and high reward. In sum, the problem is not simply due to the lack of fencing, though this deficiency enables losses. In fact, in Sedhiou, producers even noted that fencing is sometimes stolen if it is made from a valuable material, like iron. Community consultations/coordination is one way to address this properly. Many African countries have faced similar challenges, for example, in Mozambique, where local communities themselves identified solutions. Community-based and community-driven solutions to the issue should be explored.

Business and financial skills

Producers have limited business and financial management skills, which impacts the productivity of their plantations in a variety of ways. For example, rather than looking at returns, they may only consider absolute price; loans are rarely taken out to make investments in a new farm; and farm expenses are not distinguished from personal expenses. The lack of these skills is also an impediment to market linkages, since farmers are unable to effectively negotiate and interpret sales contracts. This often leads to exploitation, which naturally creates reticence to engage in similar arrangements in the future. Farmers need capacity building to do farming as a business, this is equally important, if not more so, as good agronomic practices and proper harvest and post-harvest handling. Production economics, impact of good agronomic practices on income, quality assessment, consolidation of stocks, and market linkages should all be essential topics of the farming as a business curriculum.

Access to finance

There is large potential for finance to play a greater role to increase Senegalese cashew production. This unrealized opportunity is due to challenges on both the supply side and the demand side. Like most Senegalese farmers, cashew producers are usually farmers by heritage rather than for the business opportunity. They are not necessarily accustomed to focusing on returns instead of absolute upfront investment, which means they do not generally consider taking out a loan to purchase the dramatically more expensive seedlings. There is also a general lack of trust in banks, who charge high interest rates, large fees, and require guarantees and collateral. Farmers rarely have registered, formal ownership of land, or other assets that could be collateralized. On the supply side, because cashew is relatively new in the country, financial institutions are unfamiliar with the crop and its investment potential. Banks are also reluctant to lock up capital for the three to five years it takes for a cashew tree to start producing fruit. Microfinance could be better suited to producers' needs, but traditional microcredit conditions, such as

frequent repayments starting soon after disbursement, are ill suited to cashew cultivation. Rotating savings and credit associations are another source of credit in rural Senegal, but these are considered a women's activity and the vast majority of cashew producers are men.

8.3.2 Regional variation

While many challenges are encountered everywhere in Senegal, each region has its own unique set of prevailing conditions, strengths, weaknesses, and potential.

The Casamance
Cashew has been an important crop throughout the Casamance since at least the late 1980s, rooted in the transfer of knowledge from refugees fleeing the Guinea-Bissau conflict in the 1970s and 1980s. While the conflict in the Casamance in the 1990s and early 2000s hampered economic development and government investment, and exasperated food insecurity, both NGOs and the government have since made efforts to help farmers re-establish and rehabilitate their plantations. The impact of the conflict has not been fully resolved—there are still displaced persons and land mines in some areas, and a recent incident resulted in the death of 13 people[84] - but overall, signs of insecurity are minimal.

Estimates of production for the entire Casamance are as high as 36,000 MT[85]. In 2017, over 31,000 MT came through the dry port in Ziguinchor, up from around 26,000 MT in 2016 and 23,000 MT in 2015[86]. The majority of this quantity is sent to the port of Banjul by truck, since the port of Ziguinchor is not deep enough to support large shipments. Gambian political uncertainty made 2016 an exception, during which nearly half of all Senegalese RCN exports (13,000 MT) went through Dakar. Exports through Gambia (15,000 MT) were also notably low due to measures introduced in Guinea-Bissau in 2015 to restrict export of RCN. Despite these measures, large quantities continue to leak through the border of Guinea-Bissau, though recently, stricter cross-border controls have been implemented and quantities are subsequently reducing.

Ziguinchor region
Producers in the Ziguinchor region have been cultivating cashew since the 1990s and with time, cashew has become their primary source of income. In this region, most trees are more than 20 years old and at their peak within the productivity cycle, though yields are still far below the world average. Farmers typically have a technical understanding of good agronomic practices, however, in practice, implementation of these practices is low. Farmers are not replacing old trees yet, as most trees are not that old and still productive.

[84] AFP, 2018
[85] Estimates based on many sources and regional expertise (big variation in statistics sources)
[86] Ziguinchor port data, collected in December 2017

Many farmers have extended existing plantations or started new ones in the last decade. Migrants have also come to the region and started producing cashew; in some areas, like Camaracounda, locals gift land to any man who is willing to work it. Cashew is cultivated primarily by men, with fairly large plantations of around 5-10 hectares near the Bissau-Guinea border[87]. The wider Ziguinchor region likely has a lower average plantation size, around three hectares. The 2010 IRD cashew census estimated average size per household to be 2.38ha, with 216 trees per hectare. The relative scarcity of land means it is extremely rare for women to manage their own plantations. In 2017, farm gate prices ranged from CFA 300 per kg in the early season to as much as CFA 1,100 per kg at the end of the season, with an average of around 900 CFA, representing one of the best years in cashew history.

Sedhiou region

Sedhiou is the biggest cashew producing region in the Casamance, with an estimated 24,000 households producing approximately 18,000 MT.[88] More than 30 percent of orchards have been planted in the last five years, which is expected to result in strong production growth in the near future as yields hit their peak. Sedhiou producers have been cultivating cashews for slightly less time than the those in Ziguinchor. The average tree age is around 15 years, with a minority of farmers having older trees and nearly all farmers having trees that were planted in the last 10 years, as they have sought to extend existing plantations as well as plant new ones. Indeed, one producer said that cashews are "systematically replacing" all other crops. As in Ziguinchor, most producers are male smallholders and there are very few female producers. The average plantation size is unclear, though probably between 3-6 ha.[89] The 2010 IRD cashew census estimated average size per household to be 3.56 ha, with 226 trees per hectare. In 2017, RCN prices were on average CFA 1,000 per kg, or as low as CFA 400 per kg, if sold early on in the season.

Limited market access, due to the poor condition of feeder roads and the lack of transportation, was a key complaint of producers interviewed in Mangaroungou Santo in Sedhiou.

Kolda region

Cashew production is fairly new to the region of Kolda, where the zones of Kamako and Bagadadji are the pioneers of production. The local cashew producers' association,

[87] Interviews in Camaracounda, December 2017; The 2010 CEP Baseline survey estimated the mean plantation size in the Ziguinchor region to be 13.5ha Gomez, Jaeger, and Peters, 2011, p.13)

[88] Stakeholder interviews, December 2017

[89] Interviews in Mangaroungou, December 2017, suggest that the majority of farms in that area are 3-6ha, with a not insignificant minority of 10-20 ha. This aligns with data from the 2010 CEP baseline survey, which estimated the mean plantation size in the Sedhiou region to be 9.97 ha (Gomez, Jaeger, and Peters, 2011, p.13). Data from the regional cashew trade association leadership stated that plantations were on average 2 hectares, however.

CRCOA-Kolda, estimated production to be close to 5,000 MT in 2017. While there are some plantations that have been around since the late 1990s/early 2000s, the majority seem to be less than ten years old. Though men are still dominant in cashew production, there are relatively more female farmers than in other regions due to generally greater land availability. A much more remote, dry, and resource-constrained area than the other regions in the Casamance, farmers in Kolda have the smallest plantations, with most at 1-3 hectares on average. The 2010 IRD cashew census estimated average size per household to be 2.60ha, with 156 trees per hectare. In 2017, RCN prices ranged from CFA 400 per kg to CFA 1,000 per kg, with the average price received around CFA 700 per kg. RCN quality is lower than in other Senegalese production zones, with nut counts between 215 and 225 and an outturn rate of 48-50.

Poverty, remoteness, and limited experience in cashew production mean that challenges to production are greater than other regions. However, cashew is still viable in this region as a strategic boost to farmers' incomes.

Central region, Fatick

According to analysis done by Gomez, Jaeger, and Peters[90], cashew was first introduced to Sokone, in the Fatick region, in the 1980s by the *Projet Anacardier Senegalo-Allemand* (PASA). Because of this, most trees date back to the late 1980s. While there are no official statistics available, production in Sokone alone is estimated to be at least 700 MT[91]. Cashew is cultivated primarily by male smallholders with around one to three hectares. The 2010 IRD cashew census estimated average size per household to be 2.44ha, with 164 trees per hectare. Female cashew producers are rare, making up only an estimated one percent of local associations. In 2017, farm gate RCN prices reached CFA 1,450 per kg, with an average of around 900 CFA. Such strong demand has led to an uptake in cashew cultivation, and there are now many new farmers in the region. While many of the existing cashew producers benefitted from past donor projects, including CEP, new producers have not.

8.4 RCN trade

The RCN trade in Senegal is characterized by fierce competition. Primarily Indians and their middlemen, but also Mauritanians, dominate the market as a result of their ability to quickly and easily pay producers, who can be desperate for income. Moreover, some producers face difficulties getting their RCN to competitive markets due to the lack of warehousing, the poor condition of feeder roads, and a lack of labor and transportation to move their harvest. Sedhiou in particular emphasized this challenge. Producers near the border with Guinea-Bissau also face strong competition with Bissau-Guinean RCN. In

[90] Gomez, Jaeger, and Peters, 2011, p.12

[91] Gomez, Jaeger, and Peters, 2011 estimated production at 500 to 1,000 MT. While local stakeholders could not provide an exact estimate, they noted that cashew farmers in the Sokone Farmer Field School cultivated about 1,750 ha. If yields are around 400 kg/ha, that would amount to 700 MT. This number does not include plantations outside of the FFS or elsewhere in Fatick.

Sedhiou, farmers estimated that nearly 60 percent of the cashew nuts on the market come from Guinea-Bissau, though it is likely to be less than this in reality, as the existence of Bissau-Guinean RCN in the Sedhiou market has decreased since 2015. Because prices are fixed across the border, this drives down prices in the region and erodes farmers' negotiating power.

Table 9: Senegalese RCN exports, MT

Year	Production (E)	Exported (Dakar)	Exports (Gambia)
2011	27,850	980	29,900
2012	30,300	1,120	29,200
2013	31,200	1,450	29,750
2014	33,500	1,800	33,750
2015	35,000	2,300	31,200
2016	35,550	15,000	20,550
2017	38,700	6,000	32,000

8.5 Processing

8.5.1 RCN processing

The first cashew known formal processing facility was set up in the center of the country in the 1980s as the *Société de Décorticage des Noix d'Anacarde du Sénégal* (SODEN AS). The plant quickly shut down due to technical and managerial problems – issues that continue to plague the industry today[92]. Cashew nut processing in Senegal, therefore, remains confined to small-scale units trained and equipped by USAID-funded EnterpriseWorks, IFAD, PADEC, and USDA-funded CEP (1 and 2) and artisanal processors, both of which primarily serve local markets. Facilities can be found in all Senegalese cashew-producing regions, but, like production, are concentrated in the Casamance. The largest processors include Cajou Casamance in Sedhiou and SCPL Cajou in Ziguinchor. CAC groups 17 small processors, of which only 11 were active in 2016 with very limited capacity. There are instances where processing is done across multiple facilities, for example steaming and shelling performed in one location, peeling and grading performed in a second, and roasting and packaging at a third.

[92] PADEC, 2014

Table 8: Overview of current Senegalese processors' capacity and constraints

Processor type	Processors	Available technology	Capacity utilization	2017 status
5 medium-scale plants (mostly toll processing for domestic & export markets)	• Casa Unity Production • Cajou Casamance • Cajou d'Or • SINE Agro Senegal • SCPL Cajou, Brand name DeliCajou	Mix	~400MT/ 4,000 MT (10 percent utilization)	Semi-operational: Cajou d'Or is shutdown, SINE Agro Senegal's operations are unclear; the other three were operational
50 small-scale and artisanal plants (processing for local markets)	• GIE Nafore et Pinal (Bagadadji, Kolda) • GIE Djiyito di Maleguene (Mandina Macagne, Ziguinchor) • 14 other small plants • at least 30 other artisanal groups	Mostly manual with limited mechanization, sometimes lacking equipment for the entire processing chain	50-100 MT/ 2,000 MT (~5 percent utilization)	Semi-operational

Processing plants that were still active in December 2017 were only performing toll processing. The installed (i.e., theoretical) capacity of processing units is around 5,400 MT per year of raw nuts; the actual amount processed in 2017, however, was only around 500-700 MT. The reasons for this vary from plant to plant from the list, but certain critical themes are described below. Moreover, past efforts to support the industry have had little impact as they have generally paid inadequate attention to the long-term competitiveness of producers, often supporting small-scale facilities that will never achieve enough scale to access international markets. Projects have also provided insufficient technical assistance, which is critically needed to ensure processor long-term success.

Spotlight on SCPL Cajou and Cajou Casamance

In December 2017, TechnoServe interviewed two fully operational processing plants in Senegal, SCPL Cajou and Cajou Casamance. Key learnings from these meetings are outlined below.

Cajou Casamance is a larger facility (capacity of 1,000 MT) with a layout designed for export. Thanks to a working capital loan of $400,000 from Oiko credit, in 2017, it was able to process 250 MT. All output was sold to CaroNut, in the U.S. Though one of the "lucky few" to have gained access to working capital, the time between their initial application and disbursement of the loan was nearly two years, a process afflicted by multiple delays and many high costs. Unfortunately, though they sought the advice of an ACA consultant before purchasing Muskaan equipment, none of their deshelling machines operate at the advertised rate of efficiency. Indeed, high breakage and overall inefficiency of these machines is a major hindrance to their profitability. This inefficiency, combined with the very high costs of financing and high RCN prices, though operational Cajou Casamance struggled to break even in 2017. An in-house "acquisition team" sources RCN from both farmers and traders, with the average paid around CFA 1,000 in 2017. They tried pre-financing farmers in the past, but this is difficult to do because of price volatility – even if they can negotiate a price with producers in advance, producers will end up selling to whoever will pay the most, regardless of any arrangements made in advance. Access to capital to invest in new machinery will be essential for the long-term viability of this processor.

SCPL Cajou, which sells under the brand name DeliCajou, is a small facility, but it has recently been upgraded to increase capacity and conform to health and safety requirements for export. Current capacity is estimated to be around 440 MT. In 2017, they were only able to do toll processing. Working with two organic distributers, BuurSine International and ETHIK Essence, SCPL Cajou was able to process 105 MT of RCN for export to Germany and France, respectively. This is a fourfold increase in output, up from only 25 MT in 2016. SCPL Cajou has a close relationship with BuurSine International; the latter financed the facilities upgrades and the purchase of Sri Lankan automatic de-shelling machines. SCPL Cajou also does kernel conditioning, roasting, and packaging, using kernels purchased in Guinea-Bissau. While they would prefer to do full processing, they have not yet been able to access capital to purchase RCN. Indeed, in order to mitigate against risks, SCPL Cajou has diversified into other product offerings

Despite all these issues facing local processors, there is still a way forward to keep local processing alive. One such way is to tap specialty markets, specifically organic, where there are enough margins for processors to survive while at the same time positively impacting farmers. With organic, there is a 20-25 percent premium for both processor as

well as farmers. Organic markets are strong and growing, and have a shortage of supply. Other specialty or niche markets, led by cause, impact story, or traceable supply could also be promising and are growing fast. Senegal is in a very good position to seize these opportunities while designing a larger domestic processing strategy.

Because women have more income-generating opportunities in processing than in production, the development of Senegal's processing sector could have huge impacts on their livelihoods. Most factory jobs are filled by women, but there are also women-owned facilities, such as ACASEN.

8.5.2 Cashew by-product processing

For the most part, nearly all cashew by-products are wasted due to the lack of established, large-scale by-product processors. This represents a huge lost opportunity for local income generation.

Most producers reported that there is no market for cashew apples. However, two women-owned enterprises process cashew apples in Ziguinchor. GIE DEMIIR, a cooperative sponsored by PADEC produces bottled juice for sale in Guinea-Bissau; this group remains highly dependent on the project for support. Another group, GIE Djiyito Di Malaguène, processes a variety of agro-food products, including small quantities of RCN as well as cashew apples, which are used as a base many different products.[93] The women's cooperative markets its products in its boutique in Ziguinchor, and to SENAR, who distributes them in Dakar. Since it has a long history of support from a variety of donor projects, the cooperative has not yet had to demonstrate financial sustainability. GIE Djiyito Di Malaguène requires support for packaging and marketing. Because the cashew apple processing industry is, in general, dominated by women, furthering its development has a strong potential to make a significant impact on livelihood opportunities.

Otherwise, many processors use shells to fuel their oven or steamer, but this can cause heavy pollution. One group, Wasec Ltd., has conducted research on how to produce charcoal from RCN shells. The company currently runs a small-scale facility in Burkina Faso, with plans for expansion once research efforts are completed and a final design for charcoal production is finalized in the next year or two. There are currently no known ongoing or planned efforts to process CNSL.

8.5.3 Key processing challenges

From the very beginning, Senegalese cashew processing has suffered from a variety of competitive gaps. Key challenges are outlined here.

[93] Cashew-based products include: roasted and salted kernels, cashew nutritional powder, cashew soap, cashew butter, cashew apple juice, cashew apple brochettes, cashew apple jam, dried cashew apples

Technical know-how

Because the processing industry is still young, hardly any companies have a deep understanding of the technical side of RCN processing. Most of the plants were started with little or outdated know-how, and within a short period of time, almost all have ended up shutting down operations. The lack of technical know-how and consideration of relevant competitiveness factors cause problems at all business stages. During start-up, when an uninformed investor invests in something that he/she does not have full understanding of, further issues can add to suffocating processing economics. Processors therefore rely on outside advice, which can also be unreliable, as they do not have enough contextual understanding to properly consult. Cajou Casamance ended up with faulty equipment with high breakage rates and high maintenance costs due to poor advice. Worse, there are few means of recourse in such a situation. In sum, the lack of technical know-how causes devastating operational inefficiencies that can damage a processor's ability to continue operating.

Financial and management skills

Like technical know-how, few processors have strong financial and management skills, which are absolutely critical to making informed decisions on key operational issues like factory layout and equipment choice, as well as reducing perceptions of risk associated with RCN procurement, and, of course, for providing credible documentation necessary for access to badly-needed debt and equity. Smaller facilities that have received a lot of support from multiple donor projects tend to have the weakest capacities, unable to confidently discuss profit margins, quantities purchased and sold, and other basic business measures. Even larger processors sometimes struggle to perform the financial analyses necessary to make informed operational decisions.

RCN markets

The demand and supply gap is widening, with supply chasing demand. In this scenario, RCN is and will remain scarce and the top processors will compete to the last penny to keep their processing intact. These top processors not only have experience, but also great policy support and liquidity to hold on to RCN even when the market kernel price parity is far below the RCN price. Since 2013 it was clear to the world that demand is going to surpass supply, which will have an impact on African competitiveness. Senegal produces one of the best quality nuts which places extra pressure on RCN price due to better realization of kernel output.

Currently, Senegalese processors are not able to lobby with the Government to encourage a policy to address the competitiveness of foreign competitors, as there is no export tax on RCN exports. At present and in near future, Senegalese small-scale processing will not breakeven and will have high possibility to go under due to their actual position. RCN markets have been extremely competitive in recent years, with prices sometimes changing on a weekly basis. This volatility, combined with weak downstream market linkages, make it very difficult for processors to effectively plan and forecast.

Access to finance

Access to finance is almost non-existent. This is perhaps the most pronounced bottleneck to the development of the sector. Cashew processors struggle to find affordable sources of working capital for RCN purchases and investment capital for facilities and equipment. Nearly all processors have weak equity participation, with limited support to access more equity. Financial institutions are reluctant to work with cashew processors, due to the high perceived risk. Some of this perception is grounded in reality: high default rates in light manufacturing, processors' limited financial management skills and sound technical knowledge, high volatility in RCN markets, and slim margins (due to high RCN prices). Bankers' lack of familiarity with the cashew industry, however, also contributes to this perception.

This perceived riskiness means that banks approach investments with extreme caution. Review processes are extensive and time-consuming (e.g. over six months) and total loan costs are expensive. At 5.6 percent in 2016[94], first glance might suggest lending interest rates to be reasonable. Yet banks will price rates higher for processors due to the high perceived risk. For processors lucky enough to be approved for a loan, they might face a rate of 12 percent, plus a number of additional expenses and requirements, including: high fees (e.g. 1 percent origination), additional taxes (1 percent), legal requirements (notarization and registration of the loan), and risk mitigation measures (high collateralization, guarantees, strict oversight, and third-party retention). Altogether, the true costs for a 12 percent loan come to around 15 percent. In addition to the actual expenses involved, the many efforts required to secure and manage the loan distract processors from the efficient management of their facility.

8.6 Market linkages

Few formal upstream market linkages exist. The small size of the average cashew plantation means that farmers must aggregate in order for formalized sales relationships to be reliable and efficient for processors. While interviews suggested there were some effective cooperatives in Ziguinchor (though evidence was not provided), in general the base of the cashew production industry is poorly organized. Multiple reasons were cited for this, including weak leadership and a lack of interest on the part of producers, who are often not aware of the benefits of aggregation. Lack of warehousing to store a cooperative's RCN and lack of working capital to pre-finance farmer sales are also challenges. The poorest producers prefer to sell their harvest individually throughout the season, using their RCN as a sort of savings with which they finance their regular expenses over time. This is especially true in Kolda and Fatick. The ability to pay poorer farmers at the time of nut collection, or otherwise provide them with a source of sustenance, was cited as essential to convincing more farmers to participate in

[94] World Bank, 2017

associations. Otherwise, producers everywhere have had bad experiences in the past with associations or collective sales, and are therefore reluctant to try it again.

Downstream linkages are also undeveloped. Only one processor interviewed had a formal relationship with a kernel distributer. For those who do toll processing, it is their partner who has the formalized relationship with the kernel distributer. The country's largest problem in this regard is competitive kernel production with adequate quality and minimum exportable volumes. Until these underlying conditions are achieved, processors will find it impossible to establish solid, formalized downstream relationships.

8.7 Kernel markets

Total current consumption is not more than a couple hundred tons, with an average of around 10 grams per person per year.[95] For comparison, in the U.S., consumption averages are 442 grams per person per year. Because of the many challenges faced by processors (as detailed above), there exists an unsatisfied demand in the local market. Cashew kernels are not yet available year-round, due to processors' difficulty procuring RCN. As a result, they provide only a small portion of their product to supermarkets in order to prolong the sales period. If actors were better commercialized, with better packaging and marketing, it is estimated that consumption could easily reach levels four to five times higher than the present rate of consumption. This represents a big opportunity for these local suppliers, since few international distributers target the region.

While the Senegalese kernel market is better organized than that in Guinea-Bissau, it remains dominated by kernel suppliers in the informal market. Much of the local market is supplied by women's groups located in Thiénaba and Saloum in the Casamance, such as GIE Djiyito Di Malaguène. Marketing of these products is primarily through street vendors in and around Dakar. Formalized suppliers consisted of several larger facilities in Dakar and Ziguinchor that specialize in the conditioning and packaging of dried fruit, cashew kernels, cashew apple juice production, cashew apple jam, and a range of other products. Key actors in this group include ACASEN, SENAR, SCPL Cajou, CAC, Les Saveurs du Sahel, and SIRA Foods Company. Many have started to import more kernels from Guinea-Bissau, as a result of the lack of professionalism of local kernel suppliers. These larger, more industrial suppliers sell their finished products to supermarkets and small distributers alike, to gas stations, and, in some cases to export markets. Finally, there is also a negligible quantity of imported cashew products produced by international brands.[96]

In 2017, only SCPL Cajou and Cajou Casamance were able to process for export markets. The SCPL Cajou (selling under the brand name DeliCajou) does organic toll processing for BuurSine International, who distributes organic kernels (and other

[95] Gaddas, 2017
[96] Ibid.

products) to German supermarkets, and ETHIK Essence, who targets the French market. Cajou Casamance supplies CaroNut, in the U.S. Overall, since 2014, only very small quantities of kernels have been exported to France, Mauritania, India, the U.S., Germany, and the U.K. Without additional policy support, competitiveness in international markets will continue to be a challenge regardless of efforts to increase efficiency and professionalization. However, niche markets that offer a premium for specialized kernels, like organic and fair trade, present the best opportunity for success, thanks to their higher prices. Moreover, the young state of Senegalese plantations means little would be required to prepare producers for certification. Nevertheless, the cost of certification can be relatively high, which will therefore require greater access to capital.

9 The Gambia value chain analysis

Enclosed completely by Senegal, the Gambia is a tiny West African country of only 11,300 square kilometers, with a population of two million[97]. It has consistently ranked as one of the poorest countries in the world, hampered by the long-time and increasingly authoritarian rule of President Yahya Jammeh. His exit from leadership in 2016 brings with it hopes of increased access to funding from international organizations, as well as reforms to reignite the economy.

Outside of agriculture, the economy is heavily reliant on remittances, which make up about 20 percent of GDP, and tourism, which brought in an additional 20 percent of GDP before tourism declined as a result of Ebola and the 2016-17 political transition. Agriculture generates about one-third of GDP and accounts for three-quarters of employment. Groundnuts are the most important crop and the largest export in terms of value. After groundnuts, rice and millet are also priority crops, along with cashew[98].

Though cashew cultivation dates to as early as the 1960s, it was not until recently that it started to take off in the Gambia. This is primarily due to changing market conditions, which have resulted in skyrocketing RCN prices that have driven producers to diversify into cashew cultivation. Indeed, the high raw nut price and the low relative port charges in Banjul favor raw nut production for export over domestic processing. It is therefore no surprise that the only processing taking place domestically is oriented toward the local urban and tourist markets, where margins are much more attractive than processing for export. The trade-off is that this market is too small to support much in the way of industrial-scale processing. In short, nearly all cashews produced are exported as the raw commodity.

Moreover, the overall current business climate is not currently competitive. The economy and national institutions suffered under President Jammeh, who, notorious for extracting public resources for his private benefit, reportedly bankrupted the government. These practices, combined with a poor human rights record, also scared off foreign investment and donor assistance. The result was underinvestment in public services and infrastructure, a weakened private sector (that suffered from the government's profit extractions), opaque regulatory and administrative procedures, and a weak legal regime.

In April 2016, a popular movement in Gambian called for President Yahya Jammeh to resign, with citizens demanding political reforms before the December 2016 national elections. President Jammeh had ruled Gambia's small population of just under 2 million people for more than 20 years, with unpredictable and repressive leadership. Demonstrators continued to stage peaceful protests despite the violent reaction by

[97] CIA, 2018 ("Gambia, The")
[98] Ibid.

government forces, including mass arrests, physical assaults and the use of live ammunition. This political crisis had a strongly negative effect on trade and investment in the Gambia.

Yet, the recent change in power has brought a renewed sense of hope to the Gambia. The government has openly committed to rectifying many of these challenges in order to win back the favor the foreign investors and donors and promote economic growth and industrialization.

Otherwise, the Gambian financial sector has undergone strong growth in the last few years, with the number of banks doubling. There are currently at least 12 commercial banks operating in the Gambia. Microfinance has similarly expanded in recent years, thanks to new microfinance institutions and village savings and credit associations, which now reach approximately 90 percent of households.[99] Despite this growth, poor past macroeconomic performance has led to a crowding out of private investment which has resulted in very high interest rates of around 25 percent. Financing costs that high mean credit is effectively out of reach for domestic cashew processors. For the most part, bank involvement in the cashew sector is confined to the financing of RCN trading activities. Though there is much optimism for this to change in the medium to long term, the short term will likely be marked by the status quo.

Moreover, the cashew sector is currently too small to attract bankers' attention on sector specific investment approaches. It is important to note that the profitability of cashew farmers in Gambia is excellent and presents a convincing case to secure access to financing. As in Senegal and Guinea-Bissau, bankers understanding of the sector is limited.

Logistically, navigation is easier in the Gambia thanks to its small size, relatively decent roads and a navigable river. The Gambia river can be navigated up to 300 miles inland by ocean-going ships, and even further by commercial barges.[100] There is, therefore, substantial opportunity to improve logistics by building river ports. With deep sheltered anchorage, the port of Banjul is recognized as one of the most efficient ports in West Africa. It has well-developed facilities for handling all types of cargo using modern equipment and techniques. Other advantages include better and easier access to empty containers, regular ships, ship hangers, loading and unloading capacity, and quicker operations that reduce the waiting time of exports.

9.1 Value chain overview

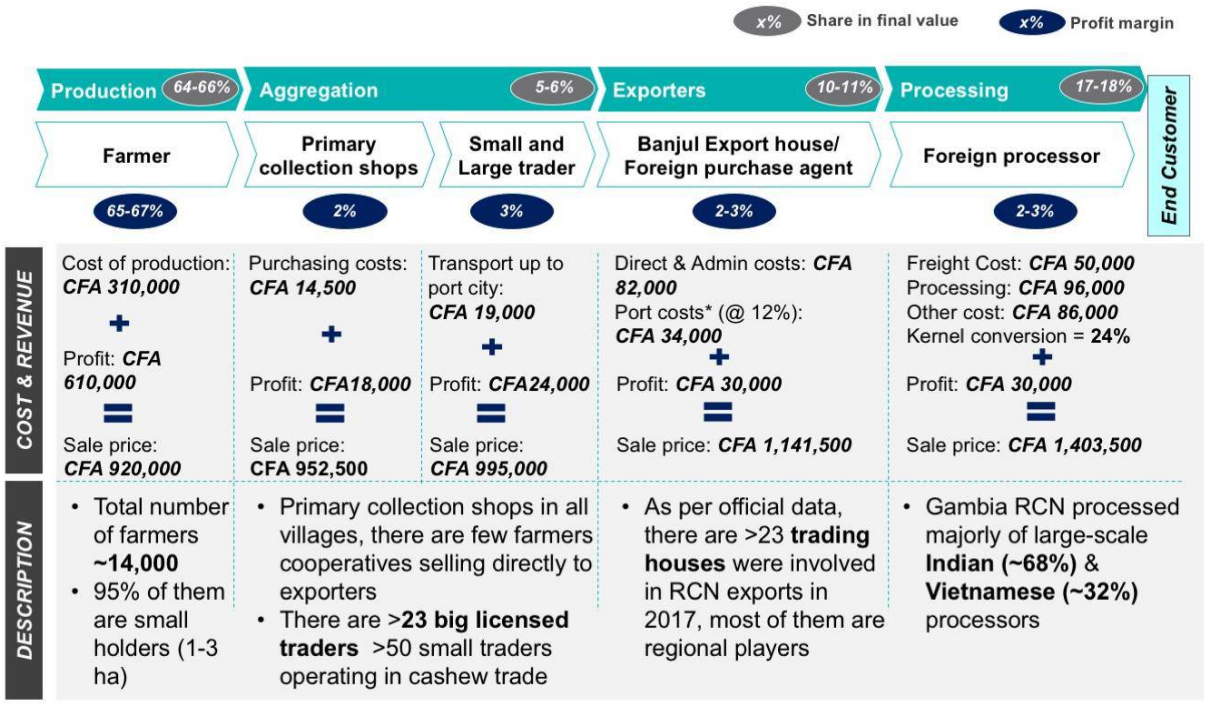
For all of these reasons, the Gambian cashew value chain is heavily dependent on RCN exports. While this means that a significant part of the final market value is gained by

[99] U.S. Department of State, 2017
[100] GIEPA, 2017

foreign processors, the value chain context favors this dependency. Local processing faces various operational risks. This inefficiency, coupled with easy access to the relatively efficient port of Banjul that results in a fiercely competitive RCN trade, imply only limited opportunity for the development of a robust competitive processing sector. However, there is still much that can be done to shorten the value chain and deliver greater income to producers.

The cashew value chain in the Gambia is long for a country of its size. Though interviews in December 2017 revealed indications that the situation is changing, multiple traders continue to operate within the chain, leveraging the opportunity to influence and alter trade dynamics to suit their needs. Very little domestic processing took place in 2017 due to high RCN prices. Nearly all production is, therefore, destined for export and so this analysis focuses on foreign processing.

Exhibit 23: Current cashew supply chain margins in the Gambia (1 MT of RCN), 2017



As seen from the exhibit above, the Gambian cashew value chain generally constitutes 5-6 actors, with 3-4 intermediaries between the farmer and foreign processor. The role of each stakeholder is varied and is explained below.

Producers

There are estimated to be around 14,000 cashew farmers in Gambia.[101] A farmer earns approximately CFA 610,000 per metric ton of RCN, having a 64-66 percent share in final market value, with considerable potential to increase income. Farmer organization has strengthened in recent years, such that some producers now sell through their cooperative, who then sell directly to exporters. Other farmers discussed ongoing negotiations between their association and a local processor for sales next season. However, in many instances, farmers continue to sell individually to middlemen. Lack of working capital to pre-finance cooperative sales, modest farmer aggregation, and weak market linkages inhibit producers' ability to gain a larger share of the value-added.

Traders

Generally, there are two to three levels of traders between the farmer and exporter, depending on farmer organization. Small and mid-sized traders tend to be local residents who are often current or former cashew producers. Such traders collect nuts directly from farmers and local markets. These local collectors then sell to larger buyers with formal relationships with exporters, who provide working capital for a specified quantity of RCN. Added together, individual traders earn commissions and collectively have a 5–6 percent share in the final market value. Because of its small geographic operating area with relatively good access to trading commission, this percentage is lower in Gambia as compared to other countries.

Exporters

Based in Banjul, this group generally consists of domestic export houses and purchasing agents of international trade groups and processors. Since nearly all domestic RCN production is exported to foreign processors, exporters occupy a critical role within the supply chain. They earn about CFA 30,000 per MT of RCN, capturing an estimated 10-11 percent of the share in final value. Exporters also tend to incur a variety of costs, including warehousing and storage, packaging, and port fees. As per data received from Government resources, there were more than 50 trading/export houses who undertook export of RCN in 2017, though these figures include Senegal export houses as well, since many work in both countries.

Foreign processors

The final destination of raw cashew nuts is the foreign processors, who are primarily Indian (57 percent of RCN exports).[102] Gambian nut count is better than most peers, with 51-52 lbs quality (which is a little less than Guinea-Bissau). External processors have relatively lower processing costs due to scale, but lower profits due to high competition and higher prices of RCN. Total processing cost of 1 MT of RCN including financing and port costs averages around CFA 180,000-185,000, with processors earning CFA 25,000-

[101] "Rabany, Ricau, and Rullier, 2015, (p.28) estimates there to be 28,000 ha under cultivation. If the average farm size is 2 ha, then there are around 14,000 cashew producers.
[102] UN, 2016

30,000 per MT of RCN as net profit. The current state of local processing is cost inefficient, faced with various operational risks and given the current price of RCN, it is a loss-making venture.

Estimated value chain demand for finance

The total estimated demand for finance over the next six years for all relevant value chain actors is US$27m. Financing is not estimated for traders and producers in 2018 as it is assumed that some time is needed to establish relationships and sensitize these groups.

Table 10: Estimated Gambian cashew sector financing need, 2018-2023 (US$, thousands)[103]

	2018	2019	2020	2021	2022	2023
Processing	$147	$2,812	$4,402	$4,714	$5,184	$5,897
Trading	$-	$368	$589	$662	$736	$810
Production	$-	$90	$128	$165	$270	$315
TOTAL	**$147**	**$3,270**	**$5,118**	**$5,542**	**$6,190**	**$7,022**

9.2 Sector organizations

Local cashew associations and Farmer Field Schools are the lowest-level of producer organizations, which are linked to larger umbrella producer associations at the sub-regional level (e.g. there are four in the North Bank), which are then linked to national-level groups. Multiple such groups exist, including: the Network of Farmers and Producers Association of the Gambia (NACOFAG), the National Farmers Platform, the National Farmers Conference, the National Cashew Farmers Association, and the Cashew Alliance of the Gambia (CAG). A group called the National Cashew Growers & Traders Corporation is no longer active.

The CAG was founded in 2010 as the apex body for all cashew stakeholders: farmers, processers, retailers, exporters, etc. Their funding has come mainly from donors, including ITC and IRD, but also membership fees – there are currently 28 members coming from all parts of the value chain. CAG's primary focus is on farmers and value-addition. At present, funding is so limited that there is only one active staff member.

Overall, these groups do not currently seem to have much strength at the national level. Research revealed that farmers have little voice in government decision-making and policy formulation.

[103] TechnoServe analysis. See Annex 12.4 on the assumptions and calculation.

9.3 Production

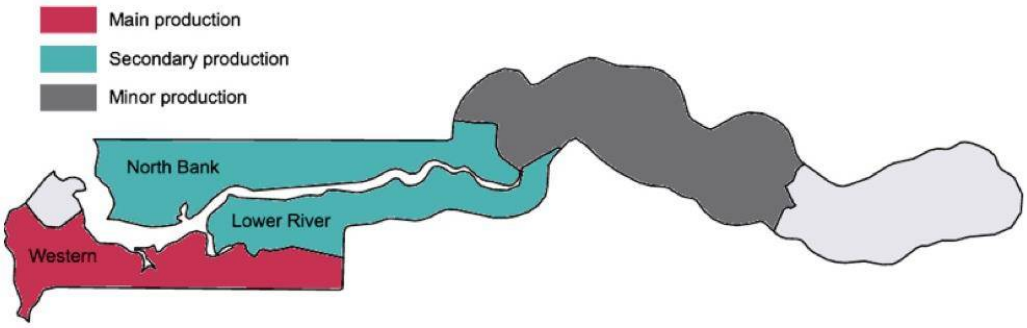
Cashews were first introduced in the Gambia as early as the 1960s, primarily as a reforestation and fire prevention measure.[104] Droughts in the 1980s and 1990s made cashews more attractive, as farmers sought to diversify their incomes into more drought-resistant crops. In the early 2000s, both production and exports of raw cashew nuts started to increase at a faster rate. Today, as in Senegal, cashews are rapidly catching on as a cash crop in the Gambia. Production is concentrated in the Western and North Bank regions, but is expanding further eastward, where poverty and food insecurity is much more prevalent. As more and more farmers are transitioning their groundnut plantations to cashew production due to increasing RCN prices, cashews are accounting for an increasingly larger share of incomes.

In 2015, the total area under cashew production was estimated to be 28,000 ha (about three percent of all Gambian territory) of which 22,000 ha were productive.[105] Most production is done by smallholders, on fields of one to three hectares, with a small minority in a range closer to four to six hectares.[106] Plantations tend to be larger and less densely planted further from Banjul. Because production did not intensify until the early 2000s, plantations are relatively young: nearly all are less than 20 years old, and most are not more than 15 years, on average.[107] Therefore, most trees are nearly at full production capacity. Yields are estimated between 400[108] and 450 kg/ha.[109] The basic seed variety is good, producing a high-quality nut with outturn rates of 50 to 52.

RCN production has increased fourfold from about 3,000 MT in 2007 to, according to the Gambian officials, 14,000 MT in 2017. Actual production was more likely closer to a maximum 10,000 MT in 2017. Gambian groundnut production as intercropping or shifting groundnut fields into cashew plantation has led to nitrogen rich soils that have had a positive impact on the quality of trees. Though farm yields per hectare are relatively high as compared to neighboring countries, farmers still lack good agriculture practices.

[104] "Gomez, Jaeger, and Peters, 2011, p.28
[105] "Rabany, Ricau, and Rullier, 2015, p.28
[106] Gomez, Jaeger, and Peters, 2011, p. 25, and confirmed through interviews
[107] "UN, 2017, p.36, and confirmed through interviews.
[108] Rabany, Ricau, and Rullier, 2015, p.28
[109] ITC, N.D., p.6

Exhibit 24: Cashew-producing areas[110]



Despite this recent growth, land resources are limited. Land near the Gambia River and its tributaries is leeched and lacks drainage, and is therefore only suitable for rice. Elsewhere, on higher ground, the soil tends to be sandy and of low fertility. Because of the tidal nature of the river, there is saline intrusion far upstream. Annual rainfall of 900-1,100 millimeters is well within the optimum range cashew trees. Agriculture is restricted to rain-fed irrigation, as the use of groundwater aquifers is not economically feasible. As a relatively tolerant and drought-resistant tree, these conditions are not an impediment to cashew cultivation, though yields would be better with higher soil fertility and irrigation at initial planting stage.[111]

As in Senegal and Guinea-Bissau, ownership of cashew plantations is dominated by men, who control women's access to land. As noted, land is scarcer in the Gambia and this means it can be difficult for a woman to have her own plantation. As a result, women farm cashew primarily through associations. Otherwise, women and children serve as a source of labor for orchards, helping with planting, maintenance, harvest, and post-harvest drying. Still, as a woman, it can be difficult to gain access to appropriate tools.

9.3.1 Key production challenges

There are a variety of constraints that currently challenge Gambian cashew production.

Research and development

Given its small size and limited resources, the Gambia has not invested much into carrying out its own research and development for cashew cultivation. Some research on its varieties was done by the CEP-funded ISRA and IRD study discussed above. Regional research can be adapted to local needs to design plating strategy, processes, and tools. The Gambia's immediate need is to produce high-yielding varieties that are

[110] Rabany, Ricau, and Rullier, 2015,
[111] Gomez, Jaeger, and Peters, 2011

resilient to climate change and adaptable to the Gambia's varying soil conditions. This can be done by a careful selection of mother trees and grafting techniques. Government funding to this end is extremely limited and only sufficient to cover administration of the Gambian National Agricultural Research Institute (NARI). Replicating successful models from other peers would be a good solution.

Technical support

Extensions services are run by the Department of Agriculture, within the Ministry of Agriculture (MOA), and implemented through seven regional offices. Services are supported both through government funding and NGOs, and cover general training in agriculture and livestock. Extension agents are not specifically trained in cashew cultivation, and while comparatively more effective than in Guinea-Bissau and Senegal, producers interviewed did not cite them as a large source of support. There is no data available on the number of farmers per extension agent or the specifics of training provided. Distinct from the extensions services, there are also 26 farmer-field schools (FFS) established by the International Trade Centre's (ITC) 2012-2016 Sector Competitiveness and Export Diversification project. FFS were originally set up to improve the quality of groundnut, sesame, and cashew production for exports. The Cashew Alliance of the Gambia (CAG) was tasked with coordinating the cashew arm of FFS services. There is currently little coordination between the FFS and the MOA, which is still catching up after a period of flux following the 2016/2017 change in government.

Both research and development and technical support are limited by the Government's relative lack of prioritization of cashew cultivation.

Agronomic practices

Training was a key part of recent projects focused on the cashew sector and, given strong demand in recent years, farmers are eager to learn and apply best practices in order to increase yields. Interviews provided some evidence that newer plantations have begun to benefit from best practices in spacing, but application of other best practices (i.e. pruning, cleaning, harvest and post-harvest handling) is still limited. Pruning is practiced, but often with the goal of collecting firewood rather than increasing yield; here, lack of knowledge seemed to be more of a constraint than tools, which was also cited as a challenge. These challenges are magnified in larger orchards, which have an even greater need for labor and tools to maintain proper care. Improper spacing and challenges preventing land clearing and intercropping are not widespread.

Planting materials

Many nurseries (18) were promoted by the USDA/IRD CEP, to include training on grafting. Interviews suggested, however, that only a handful continue to operate and those who do, do not reliably practice grafting. Difficulty in accessing necessary inputs, such as small thick plastic bags, was noted as a challenge to seedling cultivation (as well as high nut prices). Small scale and other nursery inefficiencies lead to high seedling

prices, which many Gambian farmers cannot afford or are unwilling to pay. Additionally, as long as seedlings are un-grafted, their added value over seeds is limited. Therefore, Gambian farmers more commonly plant with their own seeds, which they select primarily on the basis of nut size, but also tree age, gestation period, and appearance of the tree. The average producer does not focus on variety, though farmers interviewed discussed different "types" of cashew.

Theft and animal intrusion

Losses from theft and livestock grazing are a huge problem in the Gambia: these issues were both cited in interviews and noted in the 2011 Gomez, Jaeger, and Peters value chain study. Interviews during the study suggested losses from theft may be as high as 30 percent. This may, at least in part, be driven by laborers (often family members) who are not formally compensated. Losses due to animals are also pervasive, since livestock are allowed to roam freely for grazing purposes. Indeed, a substantial amount of RCN is collected from dung.[112] However, animal grazing primarily impacts nascent plantations or young trees. Therefore, once Gambian plantations mature this will be less of an issue. While a lack of fencing is a contributing factor to these losses, even with fencing, it is hard to reduce or eliminate theft without proper collective community participation.

Harvest and post-harvest practices

Because many cashew farmers no longer cultivate subsistence crops, they are heavily reliant on RCN sales to feed their families. This dependency, combined with the risk of theft, leads many farmers to prematurely harvest nuts.[113] One producer even noted that some farmers will rub ash on RCN in order to give the appearance of a fully matured nut. The poorest farmers also prefer to sell their nuts individually, as RCN serves as a liquid asset that allows them to pay for daily needs without worrying about where to store large amounts of cash from a single sale. Appropriate storage facilities may also be a constraint, though this was not highlighted by producers during interviews.

Organization

Recent projects have placed significant focus on better organization of farmers, with some success. There are larger umbrella associations that cover the smaller village-based associations and FFS, which have also served as an organizing mechanism. These smaller groups tend to have between 25 and 70 members. The most obvious advantage of strong organizations cited by producers is the ability to obtain a better RCN price through economies of scale and increased negotiating power. Therefore, an association's ability to do so is a strong factor to encourage farmer participation. Unfortunately, associations struggle to effectively implement collective sales for a number of reasons: lack of facilities to collect and store members' harvest, limited organizational, financial, leadership, and management capacity; and a lack of working capital to compensate

[112] Gomez, Jaeger, and Peters, 2011, p.33
[113] Gomez, Jaeger, and Peters note that nearly 10% of farmers pluck nuts from trees.

farmers at the time of collection. Given their dependence on cashew revenue, producers tend to be both risk-averse and very eager to sell their harvest. Therefore, previous failed attempts at collective sales can be very damaging to farmer organization. Indeed, lack of trust and transparency were frequently cited as major obstacles. Solid farmer organization also facilitates access to market information, the spread of best practices, and even access to labor and tools.

The level of organization varies by region, but on average it is more advanced in the Gambia than in Senegal. Producers tend to have more of a business mindset, thanks to government extension services as well as donor projects (CEP, ITC Enhanced Integrated Framework), along with greater access to information due to the country's relative smaller size.

Business skills and access to finance

The use of finance to make investments in one's cashew plantation is so rare that access to credit or other financial instruments was not cited as a major challenge to production. This suggests that few farmers look at their plantations from a business perspective, i.e. by evaluating cash in and cash out. Farmers themselves expressed the need to further develop their business skills. Moreover, the majority of Gambian farmers do not have formal land ownership, or access to other assets that can be collateralized. Farming as a business is an important curriculum besides good agronomic practices as well as harvest and post-harvest handlings to reap the full potential of farming activities.

9.3.2 Regional variation

The Gambia's small geography means there is less variation than in Guinea-Bissau and Senegal. In all areas, trees are only 10-15 years old. Still, it is important to highlight the variation that does exist.

Western Region

Bordering the metropolis of Banjul, the Western Region is characterized by greater urbanization and higher population density. This means that plantations are both smaller (1.7 ha on average) and denser (123 tress per ha) than in the North Bank and Lower River Region[114]. The majority of farmers sell collectively, with the minority that sell individually being the poorest that have an urgent need for income. Six nurseries were identified in the Western Region, of which it was confirmed that two will operate in 2018 and one will not; the other three were not reached.

North Bank Region

In the North Bank, the relative abundance of land has allowed for more producers and larger plantations (2.7 ha on average) with better spacing (108 trees per ha) [115]. The North

[114] IRD CEP Cashew Census Database, 2010, obtained December 2017
[115] Ibid

Bank is the least organized, with the overwhelming majority of farmers selling on an individual basis – associations there do not have funding to pre-finance producers before the collective sale can be made. The North Bank has the most nurseries (9). Two nurseries confirmed 2018 operations, three were considering operations "depending on demand," and four could not be reached.

Lower River Region

The Lower River Region is the newest of the three to cashew production, and therefore has the fewest orchards. Cashew producers typically manage 2.45 ha, with 107 trees per ha[116]. Surprisingly, though, the Lower River region seems to be the best organized, with nearly all farmers selling collectively through their associations. Its relative youth in the region means there is a greater need for training and capacity building on best agronomic practices. There were also only three nurseries identified, but none could be reached.

9.4 RCN trade

The RCN trade dominates the Gambian cashew value chain. In 2015, the Gambia produced and exported 8,000 MT of cashew. In that year, more than 20 companies imported and re-exported an additional 17,000 MT from the Casamance of Senegal, of which 7,000 MT was produced in that region and 10,000 MT in Guinea-Bissau[117]. The use of the port of Banjul as a key channel for exporting RCN from across the region means that Gambian farmers are the most impacted by the intensely competitive RCN trade. As raw nuts move from their production sites in Guinea-Bissau and Senegal toward the port of Banjul, accumulating transport and border transaction costs increase their price. Even if exporters must pay the same price as imported RCN, they still benefit from less risk. Indeed, the Gambia's comparative advantage due to its small size (and therefore simpler, cheaper, logistics) and port efficiency, along with limited production, leads to the intense competition and higher farm gate prices. In 2017, raw nut farm gate prices inside the Gambia reached up to 100 GMD (just over CFA 1,000) per kg, as compared to CFA 700 or 800 in Guinea Bissau and Ziguinchor, respectively.

The RCN trade is largely driven by exporters who are not processors, and who want to buy as much as possible so as to negotiate a good price with foreign processors later on (due to high demand). This leads to the predatory nature of the RCN trade.

RCN exports are much higher than production due to the re-export of nuts from Senegal and Guinea-Bissau. In 2014, RCN exports peaked at about 75,000 MT. Reduction of export tariffs and tighter border controls in Guinea-Bissau starting in 2015 have reduced the volumes coming northward. The 2016 political crisis exacerbated this trend, triggering fear among traders about trading activities through Gambia's port, which resulted in a

[116] Ibid
[117] UN, 2017, p.35

notable decline in export volumes to 20,935 MT in 2016. In 2016, exports fell to about 26,000 MT[118]. In 2017, RCN export volumes were approximately 42,000 MT[119].

9.5 Processing

9.5.1 RCN processing

Nearly all cashews produced domestically are exported as a raw nut. Processing enterprises include CashewGam, Gambia Horticultural Enterprises, Jawneh & Family, Infinite Business Intelligence, Group Juboo, Lamin Cashew Processing Enterprise, and a few small-scale facilities. These processors are located in Brikama and Serrekunda in the West Coast. Nearly all have received assistance from development projects with training and equipment donations. Installed capacity is 1,500 MT/year, though some reports claim that the capacity is up to 5,000 MT/year. This estimate was not reflected in the research conducted for this study. Regardless, utilization in 2017 was very low due to high RCN prices. Collectively, Gambian processors processed a maximum of 120 MT of RCN in 2017.

[118] UN, 2016

[119] Gambia ministries have not released actual export figures for 2017. It is estimated that 32,000 MT of Senegalese RCN and 10,000 MT of Gambian production were exported.

Table 11: Local Gambian cashew processors overview

Processor type	Processors	Available technology	Capacity utilization	2017 status
1 medium-scale plant (designed for export)	CashewGam	Indian semi-mechanized	0 MT/ 750 MT (0 percent utilization)	Shutdown
8 small-scale plants and an unknown number of and artisanal plants (processing for local markets)	• Jawney & Family Cashew Processing Enterprise • Lamin Centre for Cashew Processing • Fass women's groups • Mendy Kunda women's group • Com Afrique • Gambia Horticultural Enterprises (GHE) • Infinite Business Intelligence • Group Juboo	Semi-mechanized	~100 MT/ 700 MT (14 percent utilization)	Semi-operational

All kernels processed in 2017 were sold in the local market, namely supermarkets and hotels/restaurants catering to tourists. None of the existing local processors were able to process for export markets. The Gambia has only one processing plant, CashewGam, that is capable of processing kernels for export markets. At present, cashew processing economics leave no margins for export-oriented processing, since international prices are only 60 percent of local prices, higher standards in terms of quality and food safety mean higher costs.

Spotlight on CashewGam and Jawney and Family Cashew Processing

CashewGam is also located in Brikama. While the production manager suggested capacity was 3,000 MT, broken and poorly functioning equipment make 750 MT a more realistic estimation. CashewGam is a very large facility, well designed to comply with food safety standards necessary for export. They have obtained HACCP certification. Sadly, like Cajou Casamance in Senega, though they sought the advice of an ACA consultant before purchasing Muskaan equipment, none of their deshelling machines operate at the advertised rate of efficiency. Indeed, efficiency is so low that they no longer operate these machines. CashewGam has also sourced directly from farmers, who they have supported by providing training on quality control and minor forms of support, like bags of rice. Unfortunately, in 2017 the facility was shut down due to these equipment challenges and high RCN prices. They have been unable to gain access to finance to purchase new machines, which they view as necessary to restart production. In the past, CashewGam was toll processing for The Smiling Group, a Swedish group that purchases RCN from local Gambia farmers and then pays local facilities to process nuts for export to Sweden under fair trade labeling. The Smiling Group also provided an important source of technical assistance shortly after the plant first opened.

Jawneh & Family Cashew Processing is a small facility, located in the middle of a village in Brikama Misira. It has a capacity of around 200 MT of Raw Cashew Nuts (RCN) per annum, but was completely unable to process in 2017 as a result of high RCN prices. The facility is semi-mechanized, furnished mostly by equipment received from various donors like IRD and ITC. The processing chain is currently marked by bottlenecks, such as a small oven and lack of peeling tables, grading tables and vacuum packaging machine that prevent full utilization of its deshelling machines. Despite its small size, Jawney and Family was able to upgrade its facility and increase capacity due to IRD training in best techniques. The processing center additionally gained HACCP certification, pouches and packaging machinery through the Ministry of Trade EIF project.

Jawney & Family typically sources directly from farmers (80 percent) and middlemen (20 percent). They are considering multiple ideas to diversify and add value including different flavors of roasted nuts and the production of seedlings.

9.5.1 Cashew by-product processing

At present, there are not any formal organizations focused on the processing of by-products. GHE has tried to make juice from its cashew apples, but alcohol contents were too high for the mostly Muslim domestic market. Some producers are able to sell their apples to groups of women from Guinea-Bissau who produce and sell alcohol to their compatriots in the region. Apples otherwise go to waste and husks are not used. Some

processors use the shells as fuel, but this generates a lot of smoke, so the unit must be constructed in a way that prevents this smoke from causing health issues for workers and any nearby residents. There is however, one company, Wasec Ltd, that is working regionally on developing a technique to transform cashew shells into charcoal. There are currently no ongoing or planned efforts to process CNSL.

9.5.2 Key processing challenges

Overall, the current Gambian processing capacity and utilization is low for a number of reasons, outlined here.

Small production in a small country supported by good infrastructure. Efficient trading economics and no export tax on RCN benefit exporters over processing economics. Without an export tax to reduce competition in the RCN trade, processors will find it difficult to achieve margins necessary to achieve financial sustainability. Conversely, the Indians and Vietnamese that dominate the RCN trade have huge competitive advantage thanks to policy support and decades of experience in the industry. Moreover, the Gambia's relatively strong infrastructure make it easy for exporters to collect and evacuate RCN through the port of Banjul. In short, without policy support, Gambian processing for mainstream export markets will not be economically viable anytime in the near future.

Lack of technical 'know-how' of processing. The majority of plant owners lack in-depth prior experience in processing—this has led to over-ambitious forecasting, purchase of inapt machinery, etc. Currently, most processors have been heavily supported by donor programs, which tend to focus on social aspects over financial sustainability. Packaging and marketing capacities are similarly low, though recent projects provided some support to this end (e.g. packaging machinery). Unskilled labor means workers require extensive training and time to learn, resulting in low productivity and inefficiency throughout the processing chain.

Existing scale of processing is not at all competitive for export markets. Slim margins mean processors must achieve a very large scale in order to become financially viable. This requires significant up-front investment, which processors are unable to realize due to the lack of available finance. Processing models focused on domestic or even regional markets, where kernel prices are higher, may be more viable, but require different considerations. Moreover, by definition, these units are smaller and will therefore have less of an impact on reducing poverty through job creation.

Lack of affordable finance. The Gambia's large fiscal deficit and high levels of debt have crowded out private sector investment and led to very high interest rates, hovering around 25-30 percent. Banks are reluctant to lend to processors, who often have limited business and financial management skills. Recent political instability has also scared off foreign

direct investment, which, in any case, must compete with the highly attractive business environment in neighboring Senegal.

9.6 Market linkages

Formalized relationships between the domestic actors in the value chain are rare. While two processors interviewed (CashewGam and Jawney & Family) noted that they source directly from producer groups, processors' inability to compete with exporters on RCN prices precluded a working relationship in 2017. Limited trust, communication, and transparency were cited as obstacles as well: the average Gambian farmer lacks the ability to draft, critically examine, and enforce legal contracts, so they must be able to "trust" a buyer who states his/her intention to purchase a future harvest. The lack of formalized sales relationships means that most producers and producer associations sell to the middlemen (who are financed by Indian and Vietnamese exporters) who come directly to their farm with cash on hand to purchase their harvest.

In 2017, Gambian processors were not able to access export markets. In the past, both CashewGam and Jawney and Family did toll processing for the Smiling Group, who sells cashew-based products under fair trade labeling to a variety of Swedish distributers, including convenience stores, supermarkets, and others. Otherwise, as noted above, it will be a long time before local processors produce kernel with adequate quality and quantity to supply to international markets.

9.7 Kernel markets

The Gambian kernel market mostly consists of street vendors, supermarkets, hotels, and restaurants. Historically a major tourist destination, tourism in the Gambia presents a significant opportunity for domestic processors, if packaging, marketing, and food safety compliance is improved. Though outdated, a 2007 report noted that 75 percent of supermarkets import their cashews from Senegal and Europe.[120]

Aside from some exports to Sweden thanks to toll processing supported by the Smiling Group, the Gambia has seen negligible historical kernel exports. Lack of competitiveness means this is not likely to change in the near future.

[120] USAID, 2007.

10 Competitive benchmarking analysis

The cashew processing industry has undergone dramatic change in the last two decades. On the processing side, technological advances in India and Vietnam have led to a dramatic reduction in the training and time required to achieve profitability. As the industry moves toward automation, processing of bulk raw cashew nuts becomes increasingly cost-effective and commercially viable. The global processing industry has become very competitive, with some of the biggest processors in the industry starting to define it as a 'tight rope-walk'. Additionally, thanks to advancements in global telecommunications, access to crop information has increased significantly, reducing the competitive advantage formerly enjoyed by some larger processors. Such global connectivity means that an Indian processor sitting in Mangalore can easily access information about RCN prices in any region in Côte d'Ivoire or Guinea-Bissau. In this contemporary setting, a processor's competitiveness is primarily based on two criteria: (1) the degree of mechanization apt for the prevailing local conditions; and, (2) the ability to quickly adapt to changes in legislative policy within the country of operations.

Patterns of customer needs are changing rapidly too. Firstly, consumers and governments alike now have greater demands and preferences for reliability, food safety, quality of supply, and professional labelling and packaging. Secondly, there is a growing trend pointing towards traceability and carbon footprint as essential elements of customer decision-making. Many of the key kernels buyers are introducing legislation that imposes traceability requirements upon cashew processors. In the years to come, the prevailing practice of shipping more than 1 million MT or RCN from West African to Asia for processing, and then shipping processed kernels onward to Europe and North America, will be viewed as unsustainable. Lastly, the processing sector is also influenced by the expansion of existing international markets and the emergence of the Chinese domestic cashew market. In the 21st century, every business is prone to a multitude of factors beyond their control. No business can operate in isolation without an in-depth understanding of global competitors.

In this context, a competitive analysis is critical for the investor decision-making process. Almost all major investors/fund companies undertake some form of study before finalizing an investment opportunity. From the investor perspective, finalizing a decision to invest in a country broadly follows three steps:

1. Identifying opportunity (shortlisting geography of interest)
2. Assessing competitiveness (i.e. viability/feasibility of the business opportunity in medium-to-long term)
3. Qualitative evaluation (i.e. business policies, political conditions, and availability of support services in the country)[121]

[121] Support services include access to finance, transportation, port services, etc.

Therefore, to understand the best opportunities to support the SeGaBi region, this analysis will follow that approach.

10.1 Identifying opportunity

Currently, there are four key geographies where cashew processing is undertaken: Asia (India/ Vietnam), East Africa (Mozambique and Tanzania), West Africa (Togo, Nigeria, Ghana, Côte d'Ivoire, Benin, Guinea-Bissau, Senegal, and the Gambia), and Brazil. Each region's processing model depends on differences in geography, culture, and government policies. Therefore, it is critical for processors to shortlist a geography of interest before examining viability and business/political environment. Doing so highlights a clear long-term opportunity for cashew processing in West Africa.

In **Asia,** both countries are established processing markets with hardly any presence of foreign investors. In India, cashew processing businesses are typically family held, meaning small groups of people control the sector in a particular region. Labor costs in both countries over the past five years are rising, mainly due to a tighter labor market and a rise in minimum wages stipulated by the government. Installed capacity is oversaturated compared to RCN supply, with less than 70 percent utilized.

Although the installed capacity is significantly higher compared to West Africa, **East Africa** has hardly achieved profitability for multiple reasons. Total regional RCN production is inadequate, around 444,000 MT in 2017 (4 percent CAGR). Mozambique and Tanzania are two major cashew growers in East Africa. The presence of powdery mildew disease resulted in a varied crop harvest for the past few seasons. Disease requires treatment and in turn, increased cost of production for farmers in the region. Finally, there is also the issue of seasonality. The crop is harvested in the southern season, when demand from bigger, foreign processors and traders is at peak, and they are willing to pay higher prices than domestic processors can afford.

In **Brazil,** the model is primarily based on large industrial models dominated by a few companies which is unlike anywhere in the world. RCN production has been declining since 2005, which will make procurement difficult. Combined with other operational problems, three crop failures (2009, 2011, 2012) and competition in procuring African RCN, the number of operating plants is down from 11 to 5 in 2013.

For these reasons, Asia, East Africa, and Brazil are less strategic investment options than **West Africa**. An abundance of good quality RCN production, current and planned government incentives, and geographic proximity to major markets make it ideal for investment. The West Africa region is also unique in that it already offers full batch traceability, a requirement for U.S. food safety standards. Moreover, consumer trends favor brands that can present a strong social and environmental conscience. It is important to note that the key deterrent to investment in the African cashew market is the structure of the local economies and business environments, rather than characteristics specific to the cashew sector. However, these conditions are changing rapidly. As regional leaders, like Nigeria, Côte d'Ivoire, and Senegal achieve strong economic results

thanks to reforms, other countries will follow. Moreover, with the right support, as value chain actors increase their competency and economic strength, they will have more leverage to lobby the government to enact supportive policies. Based on this analysis, it can be concluded that, in general, West Africa offers the best opportunity for cashew processing going forward.

Competitive shortlisting within West Africa

As noted, RCN is widely produced throughout West Africa. Although overall regional production is abundant, not all countries produce sufficient quantities to support a large RCN processing industry. Using this as a necessary precondition, we can cancel out certain countries as major future processing destinations in the short to medium term. This is because the availability of good quality RCN is of the utmost importance for a processor, and given complicated cross-border trade policies, relying on imports can prove dangerous[122]. Although there is no official threshold requirement for a country to have a strong potential in processing, TechnoServe, with consensus of major industry stakeholders, finds that 30,000-40,000 MT of RCN is the bare minimum limit. Additionally, there are a few other factors that are critical for an investor to have enough confidence to support processing operations in a country, including favorable tax policies and manageable political and economic risk.[123] Based on these necessary preconditions, *we can eliminate the Gambia, Ghana, Nigeria, and Togo as major potential processing destinations in the short to medium future.*

[122] For example, Usibras and Rajkumar factories in Ghana operated at extremely low capacities over past few years due to lack of access to raw material.

[123] It is important to note that risk perception is partially derived from unknowns. In this way, political risk is viewed differently by international and domestic investors. The latter group's familiarity of the system means they may be more willing to invest when the former group will not. Guinea-Bissau is a clear example of this distinction. The business case there is strong, but the country's political history will scare off large international investors. The development of the processing industry will therefore be led by domestic actors.

Exhibit 25: Competitive shortlisting within West Africa

COUNTRY	RCN QUALITY (LBS/ 80KG)	RCN PRODUCTION (MT 2017)	ADVANTAGES/ THREATS
TOGO	44 – 46	8,000	**Pros**: Free trade zone **Cons**: Negligible production; average nut quality
NIGERIA	40 – 45	170,000	**Cons**: Poor quality of nuts; threat of invested capital due to poor adherence of law & order
GHANA	44 – 46	65,000	**Cons**: Little domestic production; Unstable currency; no policy support
COTE D'IVOIRE	46 – 49	750,000	**Pros**: Favorable business policies; Ease of finding qualified TA and management; RCN availability **Cons**: High minimum salary & business start up costs; Huge delays in customs
BENIN	48 – 50	130,000	**Pros**: Favorable business policies; availability of cheap labor **Cons**: Poor infrastructure; high buying competition from India
GUINEA-BISSAU	52 – 54	210,000	**Pros**: Best quality nuts; Huge domestic production; competitive wage policy **Cons**: Unstable political state; Poor infrastructure
SENEGAL	50 – 52	32,000	**Pros**: Good quality nuts; stable government; robust infrastructure **Cons**: Little production; Start up incentives not as favorable as Guinea-Bissau
GAMBIA	50 – 52	12,000	**Cons**: Very little domestic production

Favorable peer set

Hence, within West Africa, there are four countries that are most suitable for investment in cashew processing: Côte d'Ivoire, Benin, Senegal, and Guinea-Bissau. All four have good quality nuts; Côte d'Ivoire, Benin, and Guinea-Bissau have ample production, while Senegal has been included since it has strong potential for rampant growth over the next few years as a result of recent planting of new acreage. While Senegal currently lacks strong start-up incentives like Guinea-Bissau's income tax exemption for new businesses, its strong infrastructure and overall business environment compensates. Guinea Bissau and Senegal have an added advantage as their crops are harvested toward the end of the Northern cashew harvesting season, when price tends to escalate. This results in better decision-making and negotiating power on the procurement and sales side. A concise overview of the arguments mentioned above is provided in the exhibit above.

10.2 Assessing competitiveness

Once the opportunity is identified within a particular country, the next step of an investment decision generally involves evaluating its medium-to-long term viability. To this end, multiple factors, such as RCN production and exports, nut quality, cost and profitability, are analyzed and compared between the overall peer set, which includes the West African shortlisted countries of Guinea-Bissau, Benin, Côte d'Ivoire, and Senegal, along with the key existing industry leaders, Mozambique, Tanzania, India, and Vietnam.

Given the focus of this report, this analysis centers on the general competitive positioning of Guinea-Bissau and Senegal in absolute cost terms. It is imperative that the potential processor understands the varied nature of these risks and develops coherent strategies that will help to mitigate these threats.

For this analysis, TechnoServe created a hypothetical business plan and financial model for each country in the peer set. These country specific business plans were then analyzed and compared on multiple factors. The overall objective was to understand the competitive positioning of the processing sectors in Senegal and Guinea-Bissau, as compared to peers in absolute cost terms. This was broadly done by analyzing cost breakdown by category for each country, and by calculating profitability and breakeven points. Although the business opportunities were analyzed for a wide variety of criterion, for the sake of simplicity, the top seven evaluating criteria are summarized include:

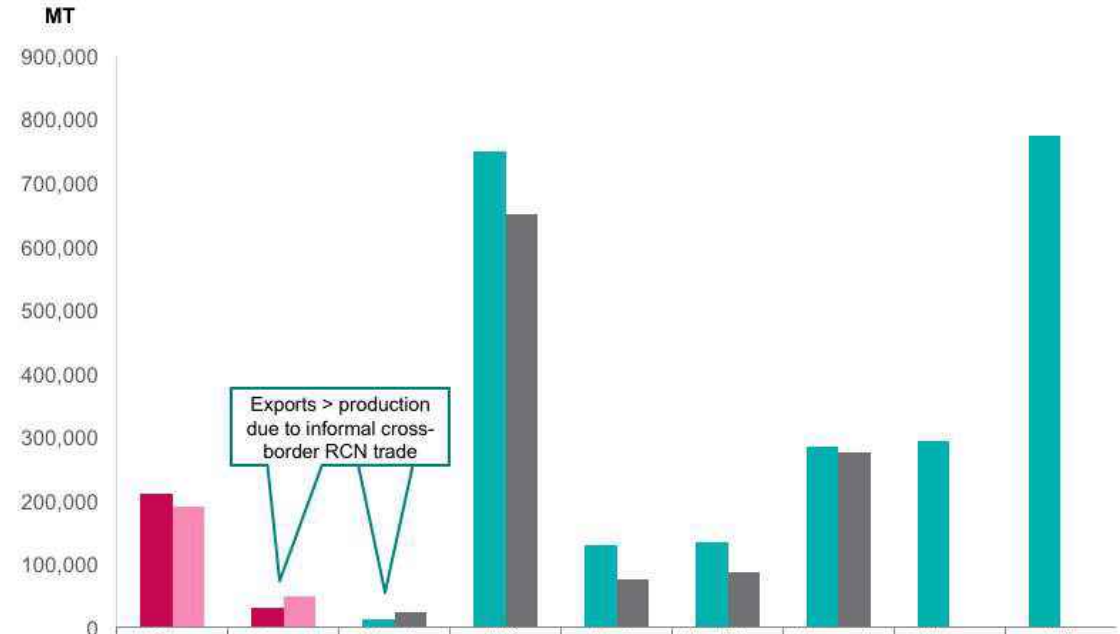
1. RCN production
2. RCN quality and price
3. RCN procurement costs
4. Fixed and variable costs
5. Taxes levied on the processing sector, such as kernel tax and income tax
6. Kernel output and net revenue
7. Net profitability and internal rate of return (IRR) and return on equity (ROE)

To create an equal playing field for comparing business plans, some key assumptions were made:

- Semi-mechanized model starting with a 3,000 MT capacity and increasing to 4,000 MT capacity in year 4; initial capex includes construction of a 5,000 MT plant and procurement of equipment for 3,000 MT; year 4 capex includes procurement of additional equipment to reach 4,000 MT capacity, and in year 5, additional capex to reach full 5,000 MT capacity
- All cost and financial values represented are for plants based on year 4, assuming utilization at 3,500 MT/4,000 MT capacity
- All costs are represented in USD; converted from local currency using 2017 averages

10.1 RCN production and exports

Exhibit 26: RCN production, MT (2017)[124]



	G.Bissau	Senegal	Gambia	IVC	Benin	Moz'bique	Tanzania	Vietnam	India
Production	210,000	32,000	12,000	750,000	130,000	135,000	285,000	294,000	774,000
RCN exports	190,000	50,000	25,000	650,000	75,000	87,200	276,100	-	-
% RCN exported	84%	111%	179%	87%	58%	65%	95%	0%	0%

With respect to RCN production, Guinea-Bissau is the fifth largest RCN producer within the chosen peer set. Guinea-Bissau's RCN production is sufficient to support the growth of the domestic processing industry. For Senegal, the current RCN production level is high enough to kick-start domestic processing activity, and more plants can be added as the production level rises. Not to be forgotten is the current huge reliance of most African countries (with the exception of Mozambique) on RCN exports.

[124] TechnoServe analysis based on multiple primary and secondary resources

10.2 RCN quality and procurement cost

Exhibit 27: RCN quality and domestic price[125]

	G.Bissau	Senegal	Gambia	IVC	Benin	Moz'bique	Tanzania	Vietnam	India
RCN Quality	53.3	51.3	51.3	48.4	48.3	46.4	52.0	49.4	49.4
RCN price	$1,565	$1,613	$1,739	$1,504	$1,482	$1,194	$1,808	$2,024	$2,095

As seen from the exhibit above, among the peer set, Guinea-Bissau has the best RCN quality with 53 lbs. average KOR. At the same time, the RCN procurement cost (US$ per MT, factory door) is among the lowest in the peer set, averaging $1,565 per MT of RCN. This means Guinea-Bissau's RCN provides great value for its prevailing market price. Though the quality of Senegalese RCN is slightly lower (even with some mixing with Bissau-Guinean nuts that leak through the border), sound infrastructure, the lack of export tax and a highly competitive RCN market result in slightly higher procurement costs. Asian processors have the highest US$ per MT procurement cost, mainly due to reliance on imports and exorbitant domestic RCN prices.

Comparing RCN quality with the price is an essential factor for processors, as the high RCN quality means high kernel yield, which translates to higher profit for the processor. It is very important for each processor to have sound RCN buying strategies that mitigate the risk of not meeting procurement requirements because of predatory buying of Asian traders.

[125] Ibid.

10.3 RCN procurement costs breakdown

Exhibit 28: RCN procurement cost breakdown by percent (US$ per MT)[126]

Bissau-Guinean and Senegalese processors' RCN costs are amongst the highest in Africa for a few reasons. The RCN from the region is of high quality and attracts processors/traders from all across the world. This results in predatory buying and inflation of RCN prices. Consequently, the RCN trader operating in the region garners a hefty commission for their role. All of these factors lead to high prices. Going forward, it will be tough for local processors to compete with Asian processors to procure RCN due to their increasing dependence on imports from Africa. Indian and Vietnamese procurement costs are already the highest amongst the peer set. Additionally, they face multiple issues from domestic growers and traders, who are demanding extremely high RCN prices year after year.

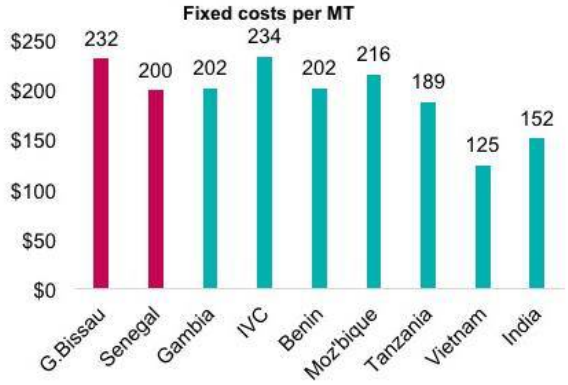
Therefore, it is imperative for processors of the SeGaBi region to form strong backward farmer-linkages to ensure sustainable supply of RCN for their processing ventures.

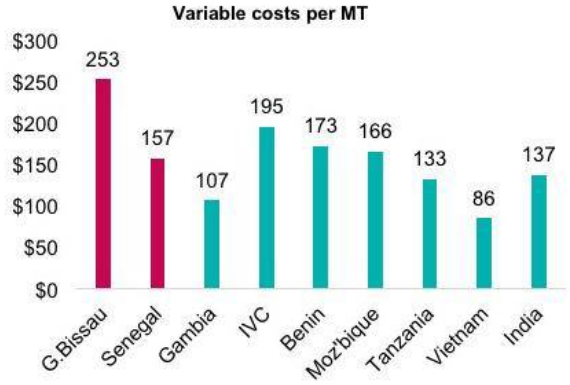
[126] Costs are estimated based on primary data collection, and confirmed through additional primary and secondary sources. Transport to factory costs cover all costs associated with moving RCN from the farm to the factory: vehicle rental, loading, road fees, etc.

Without strong and sustainable farmer linkages, the processors are most likely to incur higher procurement costs every year.

10.4 Fixed and variable costs breakdown by country

Exhibit 29: Fixed and variable cost breakdown[127]





Fixed costs breakdown (%)

	GB	SEN	GAM	IVC
Direct plant mgmt.	13%	16%	14%	14%
Fixed salaries	14%	18%	14%	16%
Electricity	15%	11%	9%	11%
Production overheads	23%	21%	29%	23%
Top & support mgmt.	15%	11%	11%	15%
Depreciation	19%	22%	22%	21%

Variable costs breakdown (%)

	GB	SEN	GAM	IVC
De-shelling, peeling, grading, recovery	30%	58%	51%	61%
Learning costs	2%	2%	2%	3%
Packaging and export	28%	39%	47%	36%
Kernel export tax	40%	0%	0%	0%

High fixed costs for Bissau-Guinean processors, mainly driven by high electricity costs resulting from energy shortages, nullifies Guinea-Bissau processors' advantage of RCN quality. Processors in Guinea-Bissau incur electricity costs nearly double those of its West African peers as they rely on running plants on generators or other off-grid options. On the other hand, high variable costs are primarily driven by the tax on kernel exports. However, it is interesting to note that apart from these two factors, Guinea-Bissau remains competitive (at par or cheaper than other processors) on all other factors of fixed and variable costs.

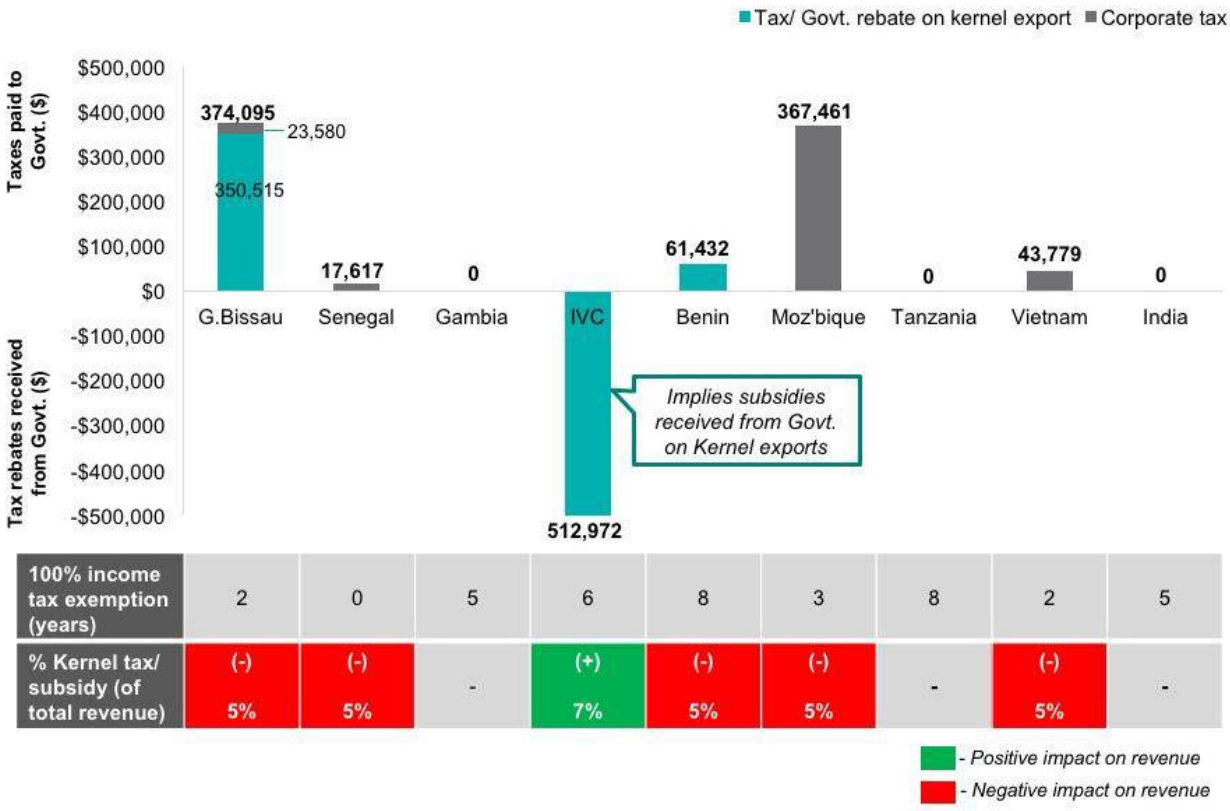
On the other hand, Senegal's personnel cost (management and labor) are among the highest in the peer set, as Senegal's minimum wage rate is relatively high. Therefore, without high worker efficiency and technical training, or kernel premiums for specialized

[127] Because cashew kernel prices are set on FOB terms. Freight costs depend on buyer location, and are therefore not included in this analysis.

markets like fair trade and organic, the processors in Senegal will face serious challenges to achieve profitability.

10.5 Taxes levied to processing sector

Exhibit 30: Taxes paid to the Government, USD[128]

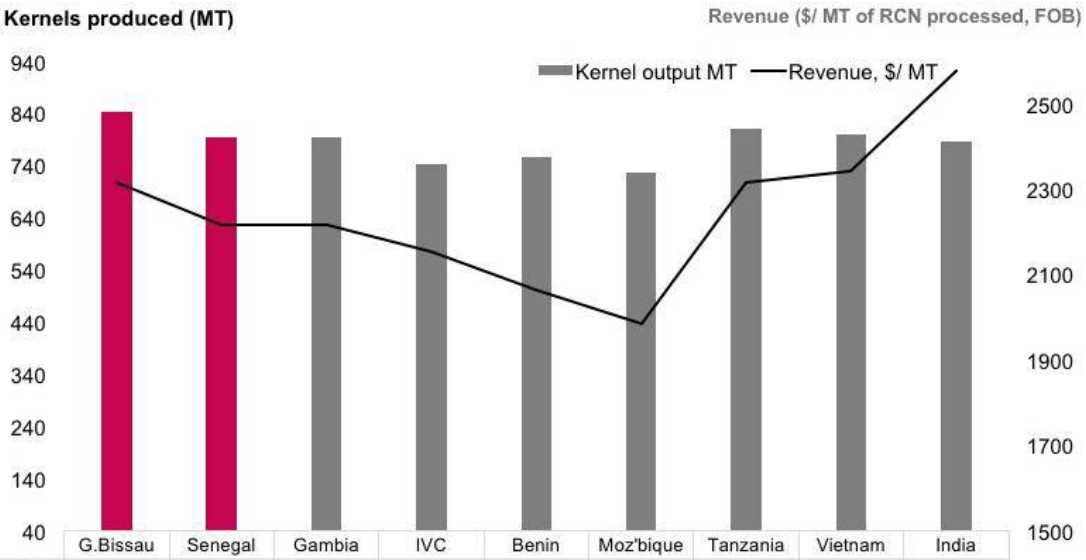


As mentioned above, Guinea-Bissau currently levies an approximately 6 percent export tax on kernels, putting its processors at a huge disadvantage compared to all peers. This tax results in an additional annual cost of more than $200,000 per year, with the cost increasing with the quantity of kernel exported. Thus, the kernel export tax is a huge hit to processors' profitability. Benin is the only other nation levying a kernel export tax; however, the rate is mediocre, at 0.85 percent. Currently, Côte d'Ivoire offers the best processing tax benefit, offering a rebate on kernel exports, which incentivizes domestic processing over RCN export.

[128] Income tax exemption exempts new processors from income taxes for a set period of time, as noted in the exhibit. This reduces the burden of initial start-up costs, having a significant impact on profits during the first years of operation. By facilitating financial sustainability, businesses are better able to expand later on.

10.6 Kernel output and net revenue

Exhibit 31: Analysis of revenue per MT of RCN



	G.Bissau	Senegal	Gambia	IVC	Benin	Moz'bique	Tanzania	Vietnam	India
Kernel output MT	845	797	797	745	758	729	811	801	788
Revenue, $/ MT	2317	2217	2217	2155	2065	1987	2316	2342	2578
RCN processed	3500MT	3500MT	3500MT	3500MT	3500MT	3500MT	3500MT	3500MT	3500MT
Kernel yields	24.8%	23.3%	23.3%	21.9%	22.2%	21.4%	23.8%	23.2%	22.7%
Kernel price/kg.	$9.59	$9.74	$9.74	$9.44	$9.54	$9.54	$9.99	$9.89	$11.10

As seen in the exhibit above, SeGaBi processors can earn a high revenue on their kernels around $2,250 per MT, more than most of their African peers. Revenue premiums are primarily due to high kernel output yield, which is a function of high RCN quality. Otherwise, India leads in terms of revenue per MT primarily due to high prices received in its domestic kernel market, superior nut quality, and high percent of whole kernels produced per MT of RCN.

10.7 Net profit, IRR, and ROE

Exhibit 32: Analysis of profitability

	G.Bissau	Senegal	Gambia	IVC	Benin	Moz'bique	Tanzania	Vietnam	India
Net profit	6%	5%	1%	4%	4%	11%	2%	2%	5%
Total costs*	94%	95%	99%	96%	96%	89%	98%	98%	95%
IRR	14%	12%	0%	15%	13%	21%	-3%	8%	14%
ROE	5%	1%	-24%	4%	3%	25%	-36%	3%	10%
Social IRR	28%	33%	26%	32%	28%	22%	28%	63%	56%

High social IRR due to high RCN farmgate price

Aggregating all of the above factors, Senegalese and Bissau-Guinean processors' net profitability is a notch higher than peers from lower West Africa. Guinea-Bissau's processing sector, despite having high kernel export tax, delivers healthy profits, generating an IRR of 14 percent and a net profit margin of 6 percent. Assuming a 2-2.5 percent risk premium on IRR for political instability[129], Guinea-Bissau returns are better or at par with other African peers (with the exception of Mozambique). Comparatively, Senegal's net profit returns are a notch lower than Guinea-Bissau, primarily due to the lack of start-up incentives within the country.

The Mozambique opportunity offers the highest net profit margin at 11 percent. This is mainly because its RCN export policies favor domestic processors over RCN exporters. This should serve as a great example for all African nations aspiring to develop their domestic processing sector. However, using this technique requires the right strategy to minimize the negative impact on farmer's income. Propagating processing in production

[129] "Chapter 3", N.D.

zones near to farmers, direct farmer linkages, and processing support in best practices at the farm level can make implementation of such policies successful.

10.8 Qualitative evaluation

In recent years, multiple incidents have caused processors to reassess and revise their methodology of capital investment. Large processors are deterred by country-specific risks and smaller entrepreneurs shy away from the technical challenges and the difficulty of doing business in Africa. Therefore, assessing non-quantifiable aspects of business is equally important to gauge success or a failure of a business.

In TechnoServe's experience, qualitative factors can be broadly classified into two categories:

- **Business and political environment of the country.** This is at the core of an investment decision and can influence the overall outcome.
- **Support services and prevailing infrastructure of the country**. Having strong infrastructure and additional services certainly provides an added advantage for a potential investor, but does not significantly influence decision-making.

These broad categories are further broken down into sub-categories as seen in the exhibit below.

Exhibit 33: Qualitative criterion breakdown

	SUB-CATEGORY	SUB-CRITERION	DESCRIPTION
Business and political environment	1 POLITICAL STABILITY	A. Government stability B. Perception of risk; safety of capital invested	A. Talks about functioning of governments and how stable are they are w.r.t completing electoral terms B. Assesses no safety/ threat to physical capital invested in country through unlawful methods
	2 BUSINESS POLICIES	A. Investment and tax incentives B. Flexible labor market C. Land and property rights D. Legal framework	A. Benefits govt. offers to investors (tax breaks/ duty waivers, etc.) B. Assess flexible are govt. policies towards hiring/ firing employees C. Talks about what is country's policy w.r.t buying & leasing land D. Assesses how easy is to solve a dispute; functioning of courts in the country, etc.
Support services and prevailing infrastructure	3 INFRA-STRUCTURE	A. Condition of roads B. Port infrastructure C. Access to electricity	A. Road connectivity from interior regions to cities, ports; their quality B. Port capacity, no. of ports the country has, taxes paid, congestions, etc. C. How reliable is the electricity service in the country & disruptions
	4 FINANCE & INVESTMENT	A. Ease/ Constraints of setting up business B. Access to affordable finance	A. Steps/ services offered by govt. to make setting up of business smooth and quick B. Availability of affordable credit in the country
	5 ROLE OF CASHEW BODIES	A. Role of Cashew governing bodies B. Supportive Cashew processing policies	A. Clear role of cashew bodies in functioning of Cashew sector, their capacity and ability to influence policies affecting cashew industry B. 'National level policies' present to help cashew processing business

All the sub-criteria are analyzed for Guinea-Bissau and Senegal's closest West African peers that could be potential competition—Côte d'Ivoire and Benin (as shortlisted above). The objective was to identify how Guinea-Bissau and Senegal fair in these qualitative aspects with respect to peers and what options a potential investor would consider as a 'next best option' apart from the region. As noted above, RCN production in the Gambia is not high enough to support the development of a robust processing industry. For this reason, it is not considered in this analysis.

TechnoServe analyzed each of these sub-criteria based on existing policies, and then calibrated this analysis with the opinions of on-the-ground stakeholders and experts. For the sake of simplicity, all insights from this analysis are categorized into a 4-part rating scale (very poor, poor, good, and very good). This qualitative exhibit provides an insightful comparative overview of key conditions that are necessary to facilitate and promote cashew sector within a nation.

Exhibit 34: Comparing qualitative criteria among peers

CRITERION		GUINEA-BISSAU	SENEGAL	COTE D'IVOIRE	BENIN
POLITICAL STABILITY	Government stability	Good	Good	Good	Very good
	Perception of risk; safety of capital invested	Poor	Poor	Poor	Good
BUSINESS POLICIES	Investment and tax incentives	Good	Poor	Very good	Good
	Flexible labor market	Good	Poor	Poor	Good
	Land and property rights enforcement	Poor	Good	Poor	Good
	Legal framework	Poor	Good	Poor	Good
INFRASTRUCTURE	Condition of roads (at cashew zones)	Poor	Poor	Very good	Poor
	Port infrastructure	Very poor	Good	Good	Poor
	Access to electricity (at cashew zones)	Very poor	Very good	Very good	Good
FINANCE AND INVESTMENT	Ease of setting business, start-up incentives	Good	Poor	Good	Good
	Access to affordable finance	Poor	Poor	Poor	Poor
ROLE OF CASHEW BODIES	Active role by Cashew governing bodies	Good	Poor	Good	Good
	Supportive cashew processing policies	Good	Poor	Very good	Very good

As seen in the exhibit, conditions are best in Benin, followed by Côte d'Ivoire, Senegal, and Guinea-Bissau.

10.9 Summary of key insights

The SeGaBi region accounts for 17 percent of West African RCN production. SeGaBi produces around 250,000 MT of RCN, 80 percent of which comes from Guinea-Bissau, followed by 17 percent from Senegal, and 3 percent from the Gambia. Guinea-Bissau is expected to remain the largest producer for the near future. Guinea-Bissau exports the largest volume of RCN. However, export duties - unlikely to be dropped in the medium term - and delays and other problems at the port of Bissau drive illegal trade flows to Senegal and the Gambia.

In the SeGaBi region, Guinea-Bissau and Senegal are positioned to set-up RCN processing ventures for their core business fundamentals. The Gambia, in the short- to medium- term, may not be able to support a fledgling processing industry due to lack of RCN production.

Labor efficiencies will be critical in determining the success of processing ventures in the SeGaBi region. As workers in the region have no prior experience in RCN processing, processors should extensively focus on providing technical assistance to workers to ramp up efficiencies and reduce learning costs.

Guinea-Bissau can augment business attractiveness and improve profitability by focusing on two major problems plaguing the processing industry: lack of reliable supply of electricity and detrimental kernel policies.

In Senegal, a rapid ramp-up of its production level will help sustain the growth of processing capacity. As predatory buying of RCN from Asian processors is expected to continue in the near future, growth in processing capacity of the country without ample RCN availability may result in shutdown of plants.

Although the overall political stability in the SeGaBi region has been generally stable over the past 2-3 years, there are multiple one-off incidents reported in the Casamance and northern Guinea-Bissau that could deter private investment. Fortunately, the situation following the contested transition of power in Gambia's 2016/2017 presidential election seems to be stable for now, important even if the Gambian processing sector is not competitive for export, since the port of Banjul is frequently the channel for regional exports. The safety of invested capital is of utmost importance to all prospective and existing processors.

There are major infrastructural gaps in the cashew producing regions of both Senegal and Guinea-Bissau; more so in the latter. Investments in roads and ports in these regions can help spur investment activity.

11 Recommendations and key focus areas for LIFFT-Cashew

Based on a deep analysis and considering global cashew trends, this section provides top-level, priority recommendations for each country, followed by recommendations for regional coordination, followed by in-depth recommendations for each SeGaBi country.

Exhibit 35: Overview of recommendations

RECOMMENDATION		GUINEA-BISSAU	SENEGAL	GAMBIA
REGIONAL COLLABORATION	R&D	Immediate		
	Coordination of cross-border trade	Immediate		
	Harmonization of trade policies	Long-term		
PRODUCTION	Pest & disease management	Immediate	Medium	Medium
	Grafted seedlings	Immediate	Immediate	Immediate
	Orchard maintenance	Immediate	Long-term	Long-term
	Orchard replacement	Immediate	Medium	Long-term
	Farm management	Immediate	Immediate	Immediate
	Access to finance	Medium	Medium	Medium
	Organic certification	Medium	Immediate	Medium
PRODUCER GROUPS	Farmer organization	Immediate	Immediate	Immediate
	Access to finance	Immediate	Immediate	Immediate
PROCESSING	Technical assistance	Immediate	Immediate	Immediate
	Access to finance	Immediate	Immediate	Immediate
	Food safety compliance	Immediate	Immediate	-
	Traceability	Immediate	Immediate	-
	Organic certification	Long-term	Immediate	Medium
MARKET INFORMATION & SECTOR ORGANIZATION	Market analysis training	Immediate	Immediate	Immediate
	Institutional development	Immediate	Medium	Medium
	Sector-wide conferences	Immediate	Immediate	Immediate
POLICY	Kernel export incentives	Immediate	Long-term	-
	RCN export controls	-	Long-term	-
INFRASTRUCTURE	Road rehabilitation & construction	Immediate	Immediate	-
	Transit warehousing	Immediate	Immediate	-

11.1 Region-wide recommendations

11.1.1 Regional coordination and collaboration

A reform on cross-border trade, involving a collection of export tax on land borders, can be a win-win situation for the entire region. This reform would be good for Guinea-Bissau as it would reduce the loss of taxes through illegal trade, and cut back on the costs necessary to control the borders. Moreover, improved overall route efficiency would result in higher incomes for producers. This reform would pave the way for Senegal traded volumes to increase, since it would no longer be illegal to import nuts into the country, thus achieving better economies of scale and reducing costs. It could also facilitate increased value addition through processing, due to better access to RCN. Under the ECOWAS Trade Liberalization Scheme (ETLS), member countries can import goods duty-free as long as they will be used for processing. In this way, RCN imported to Senegal for export through Banjul would be subject to the Bissau-Guinea export tax, but RCN imported for processing would not. The Gambia would also stand to receive more RCN volumes and generate profits through services and port handling. As it stands, with the borders closed, none of the benefits can accrue.

Research and development are strongly needed in all three countries to identify and propagate high-yielding varieties, and there is significant overlap in terms of climactic conditions. While each country will necessarily need to tailor R&D to its specific micro-climates, there is much benefit to be had from increased collaboration and information sharing. Linking research institutions, scientists, and academics can accelerate both the breadth and depth of knowledge on the cultivation of cashews. Efforts to encourage this collaboration should leverage learnings from networks like REDDA, discussed above.

11.1.2 Access to finance

Given the similarities in the challenges to access to finance in each country, SeGaBi could also develop common strategies to deal overcome these issues at a regional level.

Improving cashew farmers' access to financial products and services will promote increased and diversified productivity and expanded market participation. Access to credit is a pervasive and constant constraint to smallholders' ability to invest in their farms and take advantage of favorable market conditions. There are two main potential sources of finance for producer organizations/producers: (1) social impact funds and micro-finance institutions (MFIs); and, (2) buyer and processor pre-financing financing, such as forward contracts. Social impact funds such as Root Capital have stated their interest in increasing lending to producers and producer groups. Processors have expressed their preference to lend to village-level well-organized cashew producer organizations rather than to individual producers.

Existing and new processors access to finance can be addressed in three ways:

- On the demand side, building processors' capacity to prepare appropriate and compelling applications for finance, backed by requisite management and financial capacities and systems, and technical assistance contracts
- On the supply side, building financial institutions' knowledge about the cashew sector, processors' business models, needs, and profitability, and supporting new product development, and risk mitigation strategies
- Facilitating leasing (equipment, pre-fabricated buildings, trucks) in cashew processing sector

Such work requires an intensive engagement with processors to provide needed technical assistance not only to improve application quality, supporting bankable business plans and financial performance forecasts, but also to address performance risk. Training workshops for bankers and financial institutions can be useful for these actors to gain a deep understanding of the sector, including its opportunities and risks. Other parallel tools can be used to enable the financing environment, such as:

- Existing guarantees mechanisms like the African Guarantee Fund, ARIZ, and DCA. In Senegal, for example, DCA has unlocked $28,820,000 in lending and enabled 3,969 individual loans[130]
- Extended collaboration with private banks and financial institutions (Root Capital, Oiko Credit, OPIC, and responsAbility).
- Public-private partnerships like FUNPI. Mozambique has a successful guarantee fund created by the Ministry of Industry and USAID and implemented by the bank BCI, with processor selection and capacity building supported by technical assistance provided by TechnoServe and funded by USAID

11.1.3 Production

In all three regions, producers stand to benefit from improved awareness and application of best agronomic practices. To get the most out of the application of these practices, they will also need access to grafted seedlings produced from high-yielding varieties.

Technical support and extension to enhance production

Technical support focused on farmer capacity building on good agronomic practices, harvest and post-harvest practices, and farming-as-a-business principles is needed in all three countries. However, all production zones have their own unique characteristics, and, consequently, differing production needs. The first step to support production should therefore be the creation of regional strategic plans, outlining different interventions that are specific and well-adapted to each region.

Based on TechnoServe's experience, SeGaBi should adopt a private sector-inspired train-the-trainer-based extension model, where knowledge is disseminated to farmers

[130] USAID DCA, N.D.

through community trainers and farmer field schools. This model has proven the most successful in Africa and is currently used in almost all cashew growing countries on the continent. Continued and targeted follow-up is absolutely essential for this approach to be effective and sustainable.

Training itself should prioritize demonstration plots and hands-on instruction over a classroom-style instruction model, in order to leverage the persuasiveness of "seeing-is-believing". The capacity building of farmer groups can be done anywhere, so long as it is done in a way that producers can immediately practice what is learned. Farmers who have already applied best practices and seen results first-hand can provide testimonials, which serve as an effective source of persuasion for more risk-averse producers. At the time of training or soon thereafter, producers should have the opportunity to see first-hand the results of practices learned. This observation can be done on a formal demonstration plot, such as one run by state-led research institutions, on small plots of land allocated by producers in each locality, or simply in the orchard of a producer who has best adapted agronomic practices, often with direct support of trainers. This approach is both more effective overall and in terms of cost, since it does not require expenses like facility rentals or large transport costs. This approach is a major focus for ACI and TechnoServe's programs in various countries.

Production of grafted seedlings

There exists a present and near future need to replace old acreage and unproductive trees, and plant new trees using well-selected high-yielding varieties. This will require identification of mother trees for grafting material to produce grafted seedlings and perform top working on old trees, by grafting old tree stems to high-yielding grafts. Countries Mozambique, Côte d'Ivoire, and Benin have achieved success identifying local genetic material, grafting techniques, and nursery extension models; learnings from these experiences should be leveraged for LIFFT-Cashew. Otherwise, specific recommendations to achieve this include:

- Selection criteria and the process for identifying high-yielding, disease-resistant mother trees should be determined with the utmost care as these approaches will have a huge impact on production
- Special attention must be paid to trainings on top working, as there is a high risk for improper techniques that lead to stem borer damage in geographies (such as Biombo in Guinea-Bissau) plagued by such issues. Any attempt at top working in these zones requires expert evaluation
- Training of trainers should be done to develop local grafting technicians to facilitate nursery development
- Regarding the establishment of a more centralized breeding program, Dr. Peter Masawe, International Consultant, Naliendele Agricultural Research Institute (NARI) in Tanzania is an excellent reference

11.1.4 Processing

Support to processors should focus on technical and business skills, access to finance, and market access and linkages.

To address the lack of technical and business knowledge, the following focus areas are recommended:

- **Business start-up support,** including business planning, financial modeling and forecasting, facility design, construction oversight and planning, technology selection, and networking with investors to increase equity participation
- **Management and overall labor productivity,** including in-depth training of senior and middle management and workers on role clarity and performance improvement
- **Market access mechanisms,** including market linkages (upstream and downstream), adherence to food safety policies, and how to identify, manage, and hedge against policy risks
- **Operational support,** including supply chain management (to include outsourcing certain stages of processing, such as deshelling, to small-scale low capacity plants), RCN inventory and warehousing, financial and business management, and human resources
- **Marketing and commercialization**, including market research, branding, advertising, communication, and packaging; these interventions are especially important to develop the nascent cashew apple market
- **Product development**, to include diversifying product offerings, especially for cashew apples
- **Management and financial services consulting**, including capacity building of local service providers

11.1.5 Market access and linkages

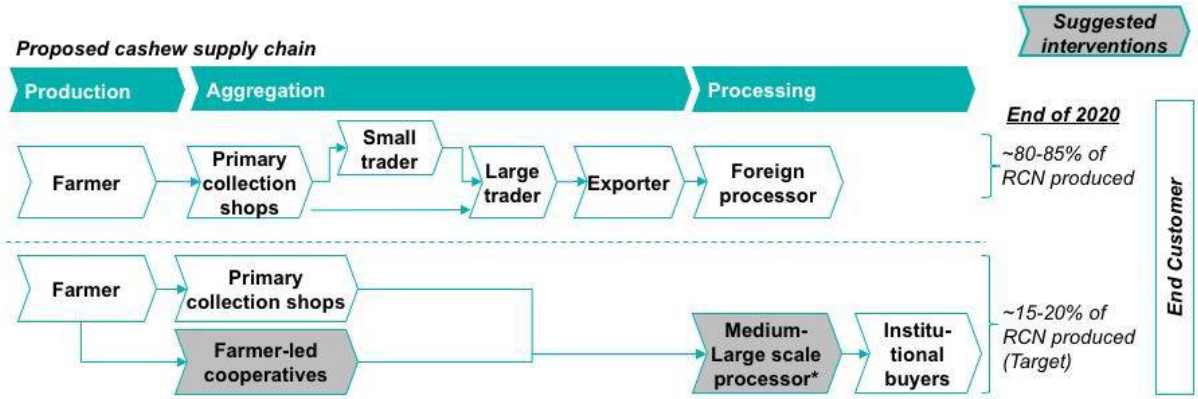
Upstream linkages

The value chains of all three countries involve more intermediation than is efficient. Minimizing intermediation would not only be more efficient but also would make traceability easier and thus create a more transparent value chain. The removal of certain layers would also likely result in a higher share of profits for smallholder farmers. As per TechnoServe's industry experience in developing domestic processing in Africa, farmer-led cooperatives play a critical role in achieving this, replacing small and large traders by establishing a sustainable supply base for processors. The organization of farmers into cooperatives enables producers to achieve adequate aggregation to work with processors, as well as supporting producers' ability to consistently supply high quality nuts for processors to meet global kernel requirements. This also allows processors to invest in improving upstream capacities. For success to endure, benefits must accrue to all parties up and down the value chain—the attainment of shared value must be the

target of all efforts. In short, through producer aggregation, overall RCN procurement processes can be made very efficient. This is best achieved through:

- Capacity building of farmer associations on market information and collective bargaining
- Facilitate buyer-seller (processor-farmer) meetings
- Addressing financing need of farmer groups

Exhibit 36: Suggested market linkages



The proposed intervention of farmer aggregation aims to reduce the layers of the supply chain significantly. The primary collection shops will sustain and play a critical role given their depth and outreach to farmers; but the long-term strategy should be to develop more and more farmer cooperatives that are directly linked to processors/traders for sales. Realistically, RCN exports are still going to be major part of the regional cashew value chain. However, even if Guinea-Bissau, for example, only processes one-tenth of the domestic RCN production, the country could earn around $25-35M in additional revenue by 2020.

Downstream linkages

Downstream linkages depend on processors' ability to compete in global markets. This can be improved through:

- Building capacity of processors to improve their implementation of food safety compliance measures. Improving implementation of food safety management systems (FSMS) like HACCP, BRC etc. as per market requirements
- Training on how to implement traceability with producers and producer organizations
- Training and technical assistance to new and existing processors on quality control and batch processing

Once these conditions are met, support should focus on facilitating buyer-seller meetings, such as through participation in trade fairs and sector conferences.

11.1.6 Market information systems and sector organizations

Access to information and collaboration are critical for the development of the cashew sector. These efforts should include:

- Training of all stakeholders on how to use market trend and pricing data, such as N'kalô and CashewInfo, and specifically on how to read and apply information within their specific context; clear guidelines and checklists are useful tools in this domain
- Institutional capacity building and organizational development of stakeholder's platforms like CAG, COFAS, ANAG, ANCA, processors, ATC or Inter-Profession (if created in the near future) and other Government bodies
- Facilitate participation of key value chain actors in strategic decision making and incubation of information and impactful dissemination tools
- Facilitation of regional information exchanges and collaboration on best practices

11.1.7 Policy

The right policy environment can make or break the industry. Efforts to support informed policy-making can include:

- Building capacity of stakeholders through policy workshops focused on issues like trade, labor, and cooperative policy and regulation, as well as learning from experiences in other countries
- Conducting benchmarking studies with other countries as it relates to trade policy, and then sharing findings

11.2 Guinea-Bissau

Key priorities

In Guinea-Bissau, there is an urgent need for improved maintenance of farms, disease treatment, and new planting support to maintain the current production levels and sustain production growth. There is already sufficient production and conducive RCN policies to incubate a sustainable processing industry; therefore, key priorities are to sustain current production and growth, while focusing on increasing domestic processing through technical assistance, and improving sector organization. Reforming the current kernel export policy would also enhance cashew processing competitiveness

All three production zones have their own unique characteristics, and, consequently, differing production needs. In general, the focal points of each region include:

- The North requires the most support to maintain the health of its current plantations, including: thinning, pruning, cleaning, and, post-harvest practices like drying. The

region also needs help to improve marketing, including a focus on areas that are strategic for linkages with processors

- The East requires the most support to continue new planting and increase resiliency of young plantations, including: land preparation, planting techniques like proper spacing and seedling preparation, proper seed or seedling selection, community awareness on animal and farming conflicts
- The South requires immediate attention to control pest and disease risks, as well as support to rehabilitate old orchards

11.3 Senegal

Key priorities

In Senegal, current RCN production levels of 35,000-40,000 MT per year are sub-optimal for domestic processing. Combined with the absence of an export duty, this renders domestic processing uncompetitive. As a result, key priorities are to focus on increasing production levels, develop a niche in organic RCN production, and improve processing for specialty markets.

All four production zones have their own unique characteristics, and, consequently, differing production needs. In general, the focal points of each region include:

- Sedhiou and Ziguinchor have similar characteristics. Production support in these regions should focus on enhancement, solidification, and application of the basic knowledge of agronomic practices that already exists thanks to past donor projects. As plantations are hitting key production, orchard maintenance will be especially important. Support to improve producer organization is also badly needed, both to strengthen access to technical support and improve producer negotiating power in the sub-region's highly competitive RCN market. Rehabilitation of feeder roads not improved by recent efforts is also needed to improve market access.
- As a newer cashew producing region, Kolda needs support on planting techniques and materials, and protection and care for younger orchards. As a more remote region challenged by higher rates of poverty and lower access to basic services, it will be especially important to use training tools that are adapted to low levels of literacy. Aggregation and collective sales could also have a large impact, in order to spread the higher costs of transportation resulting from the region's further distance to both processors and exporters.
- Fatick is also undergoing a period of new planting, and therefore requires similar targeted support on planting techniques and materials, and protection and care for younger orchards. Addressing issues like theft and animal intrusion through community solutions could have a large impact on producer incomes. Moreover,

given its relative proximity to Dakar and the lack of any larger processing facilities, the Fatick region could be strategically placed as a site for the burgeoning processing industry.

Implementation of support should follow the guidance outlined in the regional section above.

Otherwise, there is a strong opportunity to develop organic production and processing in Senegal, which would not only increase producer profitability. It would also support processing competitiveness. Moreover, the traceability requirements of organic certification would further support both access to markets and access to finance. Due to relatively high costs for certification, enabling access to finance is especially important. Fair-trade and other niche markets that provide an additional premium should also be considered as a way to improve processing margins.

To better develop the mainstream processing sector, adequate policy support from the Government is needed to enhance processor economics and mitigate the predatory nature of the RCN trade. This is often done by bringing an export tax on RCN, but other measures (e.g. investment matching or introductory income tax exemptions) to support processor competitiveness can be more effective for smaller levels of production, as in the Gambia and Senegal. Export taxes must be approached with extreme caution and designed in a way to ensure tax revenues are directly invested to support producers. Without this redistribution, export taxes can have a strong negative impact on producer income and production growth. In Guinea-Bissau, such a tax already exists, but revenues could be used more effectively.

Finally, the Senegalese cashew value chain stands to benefit strongly from better organization. The current sector organizations that exist are predominantly at the producer level and are at a very nascent stage. Capacity building and workshops that involve all stakeholders are needed to enhance the linkages that will lead to strong trade associations.

11.4 The Gambia

Key priorities

The combination of low production volumes, an efficient port, and a small geography mean the Gambia is most competitive in RCN exporting, and least competitive in export-oriented processing. As a result, the number one priority should be to focus on increasing production. Minimizing intermediation by strengthening producer groups and their linkages to exporters is also important.

The Gambia's production economics are the best of the three countries in the SeGaBi region. An enhanced focus on access to finance can support farmers to invest in commercial plantations and new planting models. Region-specific points include:

- In the Western Region, smaller plantations and higher tree densities mean it will be important to focus on orchard pruning and cleaning in order to maximize yields. Proximity to the port of Banjul, as well as domestic processors in Brikama provide a great opportunity to enhance producer-processor and producer-exporter linkages. Farmer field schools are active in the region, and there is already a base understanding of agronomic practices. This existing foundation needs only to be enhanced to support the propagation of knowledge to new farmers, and to encourage application of existing knowledge.
- In the North Bank, a greater availability of land means good opportunities to expand cashew cultivation into new fields. There are also many existing plantations at or near peak yield. Capacity building should therefore focus both on planting and young orchards, as well as their proper maintenance to maximize yield. To support food security as new producers transition to cashew production, the use of intercropping should be underlined. The North Bank is similarly characterized by active farmer field schools and the same advice applies.
- As the most east and therefore the newest of the three regions to cashew cultivation, the Lower River Region will require significant support to train new cashew producers. There will also be a greater need for grafted seedlings. Even more so than the North Bank, intercropping to support food security is important due to higher levels of poverty.

Implementation of support should follow the guidance outlined in the regional section above.

As for processing, the Gambia's limited availability of land mean it will never produce enough for export-oriented processing to be a large part of its value chain. Instead, processors should focus on the domestic market, which, thanks to tourism and a relatively high GDP per capita, is characterized by unmet demand. Processors can also consider focusing on specialty markets processing, as in Senegal. In both cases, however, any investment should be preceded by in-depth feasibility and profitability analyses.

12 Annexes

12.1 References

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12.2 Key value chain actors

Country	Focus	Organization
Gambia	Export	Banjul Port Authority
Gambia	Export (kernels)	The Smiling Group (Oscar)
Gambia	Export (RCN)	Cropscore Enterprise
Gambia	Export (RCN)	Emkay Stores Ltd
Gambia	Export (RCN)	Zig agro Sarl
Gambia	Interprofession	Cashew Alliance of Gambia
Gambia	Processing	CashewGam
Gambia	Processing	Fass womens group
Gambia	Processing	Gambia Groundnut Cooperative
Gambia	Processing	Infinite Business Intelligence
Gambia	Processing	Jawney and Family Cashew Processing Enterprise
Gambia	Processing	Lamin centre for cashew processing
Gambia	Production	National Farmers Platform
Gambia	Production	Network of Farmers and Producers Association of The Gambia (NACOFAG)
Gambia	Production (Govt, stats)	Ministry of Agriculture Directorate of Planning
Gambia	Production (Govt)	Department of Agriculture
Gambia	Production (Govt)	Ministry of Agriculture
Gambia	Production, Processing	Gambia Horticultural Enterprises
Gambia	Production/Processing	Nuts About Education
Gambia	R&D	National Agricultural Research Institute
Gambia	Trade (Govt)	Gambia Investment & Export Promotion Agency (GIEPA)
Gambia	Trade (Govt)	Ministry of Trade, Industry, Regional Integration and Employment
Guinea Bissau	Export	Bissau Port Authority
Guinea Bissau	Export	Cashew Exporters and Importers Association

Country	Focus	Organization
Guinea Bissau	Finance	Ecobank
Guinea Bissau	Investment (Govt)	DGPIP
Guinea Bissau	Processing	Agribissau
Guinea Bissau	Processing	AMAN BISSAU
Guinea Bissau	Processing	ANSIPER
Guinea Bissau	Processing	Arrey Africa
Guinea Bissau	Processing	ATC-Caju
Guinea Bissau	Processing	ATLANTICO Caju
Guinea Bissau	Processing	B&B Caju
Guinea Bissau	Processing	Cooperativa Buwondena
Guinea Bissau	Processing	Cooperativa Sabunhima
Guinea Bissau	Processing	CUCAJU
Guinea Bissau	Processing	DJONDE
Guinea Bissau	Processing	EMICOR
Guinea Bissau	Processing	Gap Solutions SARL
Guinea Bissau	Processing	Groupo santy
Guinea Bissau	Processing	INVESTICAJU
Guinea Bissau	Processing	Investimento Angolano
Guinea Bissau	Processing	LIACO/ADTA SARL (Lybios) 1
Guinea Bissau	Processing	LIACO/ADTA SARL (Lybios) 2
Guinea Bissau	Processing	LIACO/ADTA SARL (Lybios) 3
Guinea Bissau	Processing	Licaju
Guinea Bissau	Processing	QUADE e QUADE
Guinea Bissau	Processing	Santi cashews
Guinea Bissau	Processing	Santy/West Africa Cashew
Guinea Bissau	Processing	Sicaju
Guinea Bissau	Processing	West Africa Cashew (santy)
Guinea Bissau	Processing (apple & nut)	Emicor
Guinea Bissau	Processing (trade association)	ACA/ATC Caju/Djonde ltd
Guinea Bissau	Production	CAOJAQ (cooperative)
Guinea Bissau	Production	KAFO (cooperative
Guinea Bissau	Production	OPRO (cooperative)
Guinea Bissau	Production (trade association)	Association National de Agricultivateurs (ANAG)
Guinea Bissau	Production (NGO)	ADPP

Country	Focus	Organization
Guinea Bissau	Production, processing	(small processing unit)
Guinea Bissau	Regulation	ANCA
Guinea Bissau	Trade, Investment	Safcom Ltd
Guinea Bissau	Value chain project	PRSPDA
Senegal	By-product (apples)	Zena Exotic Fruits
Senegal	Export	Dakar Port Authority
Senegal	Export	Ziguinchor Port Authority
Senegal	Export (kernels)	ETHIK Essence
Senegal	Finance	BNDE
Senegal	Finance	Crédit Mutuelle
Senegal	Finance	Root Capital
Senegal	Interprofession	Consultation Framework of Cashew Stakeholders of Casamance (COFAC)
Senegal	Processing	ACASEN
Senegal	Processing	Batagdina Processing Unit
Senegal	Processing	Cajou Casamance
Senegal	Processing	Caju D'ore
Senegal	Processing	Casa Unity poduction
Senegal	Processing	Comafrique limited
Senegal	Processing	Complex Agro Alimentaire
Senegal	Processing	Darsalam cashew farmers association
Senegal	Processing	Delise Liza
Senegal	Processing	Diouloulou community processing unit
Senegal	Processing	Diouloulou womens group
Senegal	Processing	Djibonke Processing unit
Senegal	Processing	FASS DIOM
Senegal	Processing	GIE Nafore et Pinal
Senegal	Processing	GIE Nafore et Pinal
Senegal	Processing	Group Juboo
Senegal	Processing	Kandialang womens group
Senegal	Processing	Kouthioye womens group
Senegal	Processing	Mendy Kunda womens group
Senegal	Processing	Ndiaffe Ndiaffe womens group
Senegal	Processing	Ngalu Mbailandi

Country	Focus	Organization
Senegal	Processing	PADEC
Senegal	Processing	Performance Afrique
Senegal	Processing	Samassansang womens group
Senegal	Processing	SCPL Cajou, brand name DeliCajou
Senegal	Processing	SENAR
Senegal	Processing	Senghalene community processing unit
Senegal	Processing	SINE agro Senegal
Senegal	Processing, By-product (apples)	GIE Djiyito Di Malaguène
Senegal	Production	Cadre régional de Fatik et Sokone
Senegal	Production	Cadre régional de Kolda
Senegal	Production	Cadre régional de Sedhiou
Senegal	Production	Cadre régional de Ziguinchor
Senegal	Production	Federation de Balatakunda
Senegal	Production (Govt)	Minister of the Environment and Sustainable Development
Senegal	Production (Govt)	Ministry of Agriculture and Rural Equipment
Senegal	Production, Kernel distribution (organic)	BuurSine International
Senegal	R&D	Centre National de Formation des Techniciens des Eaux, Forêts, Chasses et des Parcs Nationaux (CNFTEFCPN)
Senegal	R&D	University Assane Seck de Ziguinchor (UASZ)
Senegal	R&D, Extension	Direction des Eaux, Forêts, et Chasses
Senegal	Trade advocacy	Enda Casid
U.S.	Kernel distribution	CaroNut

12.3 Demand for finance calculation

Using TechnoServe's experience and knowledge of the cashew industries in the SeGaBi region, an estimation for the demand for finance was calculated as follows. Financing is not estimated for traders and producers in 2018 as it is assumed that some time is needed to establish relationships and sensitize these groups.

Regional demand for finance estimation

	2018	2019	2020	2021	2022	2023
Processing	$5,374,180	$12,937,546	$18,886,289	$22,849,822	$27,830,796	$34,490,738
Trading	$-	$1,104,000	$1,766,400	$1,987,200	$2,208,000	$2,355,200
Production	$-	$270,000	$390,000	$540,000	$750,000	$900,000
Total financing need	**$5,374,180**	**$14,311,546**	**$21,042,689**	**$25,377,022**	**$30,788,796**	**$37,745,938**

This regional estimation is based on the following country-level calculations. Processor utilization growth rates are driven by their current levels of utilization – smaller levels of utilization have the capacity to grow at faster rates than lower levels. RCN trading quantities are estimated to reflect the unmet demand that exists from the lack of exporter pre-financing, and the realistic reach of credit. Likewise, farmer numbers are estimated to reflect the realistic reach of credit. In both cases, since formal financing to these groups will be a new, mostly un-tested enterprise, the numbers are deliberately conservative.

12.3.1 Guinea-Bissau

Key Assumptions - constants

Utilization growth rate		2017 processor utilization (MT RCN)		Number		$/farmer	$/trader or processor
Medium	Small	Medium	Small	of traders	of farmer groups		
30%	60%	3,740	95	150	80	$150.00	$920/MT

Key Assumptions - annual

	2019	2020	2021	2022	2023
MT/group	5	8	9	10	11
MT/trader	2	3	4	5	6
# of farmers	450	750	1000	1500	1800

Key Assumptions - demand for RCN estimation (MT of RCN)

	2018	2019	2020	2021	2022	2023
Processing: possible utilization, as per current status (in MT of RCN)						
Medium	4,862	6,321	8,217	10,682	13,886	18,052
Small	152	243	389	623	996	1,594
New	-	2,500	4,000	4,000	4,000	4,000
Total processing (MT)	**5,014**	**9,064**	**12,606**	**15,304**	**18,883**	**23,646**
Trading: possible demand for RCN (in MT of RCN)						
Farmer groups	-	400	640	720	800	880
Traders	-	300	450	600	750	900
Total trading (MT)	**-**	**700**	**1,090**	**1,320**	**1,550**	**1,780**

Demand for finance estimation (US$)

	2018	2019	2020	2021	2022	2023
Processing	$4,612,880	$8,338,696	$11,597,428	$14,080,054	$17,371,905	$21,754,413
Trading	$-	$368,000	$588,800	$662,400	$736,000	$736,000
Production		$67,500	$112,500	$150,000	$225,000	$270,000
Total financing need	$4,612,880	$8,774,196	$12,298,728	$14,892,454	$18,332,905	$22,760,413

12.3.2 Senegal

Key Assumptions - constants

Utilization growth rate		2017 processor utilization (MT RCN)		Number		$/farmer	$/trader or processor
Medium	Small	Medium	Small	of traders	of farmer groups		
50%	30%	250	225	150	80	$150.00	$920/MT

Key Assumptions - annual

	2019	2020	2021	2022	2023
MT/group	5	8	9	10	11
MT/trader	2	3	4	5	6
# of farmers	750	1000	1500	1700	2100

Key Assumptions - demand for RCN estimation (MT of RCN)

	2018	2019	2020	2021	2022	2023
Processing: possible utilization, as per current status (in MT of RCN)						
Medium	375	563	844	1,266	1,898	2,848
Small	293	380	494	643	835	1,086
New	-	1,000	1,800	2,500	3,000	3,500
Total processing (MT)	**668**	**1,943**	**3,138**	**4,408**	**5,734**	**7,434**
Trading: possible demand for RCN (in MT of RCN)						
Farmer groups	-	400	640	720	800	880
Traders	-	300	450	600	750	900
Total trading (MT)	**-**	**700**	**1,090**	**1,320**	**1,550**	**1,780**

Demand for finance estimation (US$)

	2018	2019	2020	2021	2022	2023
Processing	$614,100	$1,787,330	$2,887,029	$4,055,588	$5,275,139	$6,838,993
Trading	$-	$368,000	$588,800	$662,400	$736,000	$809,600
Production		$112,500	$150,000	$225,000	$255,000	$315,000
Total financing need	**$614,100**	**$2,267,830**	**$3,625,829**	**$4,942,988**	**$6,266,139**	**$7,963,593**

12.3.3 The Gambia

Key Assumptions - constants

Utilization growth rate		2017 processor utilization (MT RCN)		Number		$/farmer	$/trader or processor
Medium	Small	Medium	Small	of traders	of farmer groups		
25%	60%	0	100	150	80	$150.00	$920/MT

Key Assumptions - annual

	2019	2020	2021	2022	2023
MT/group	5	8	9	10	11
MT/trader	2	3	4	5	6
# of farmers	600	850	1100	1800	2100

Key Assumptions - demand for RCN estimation (MT of RCN)

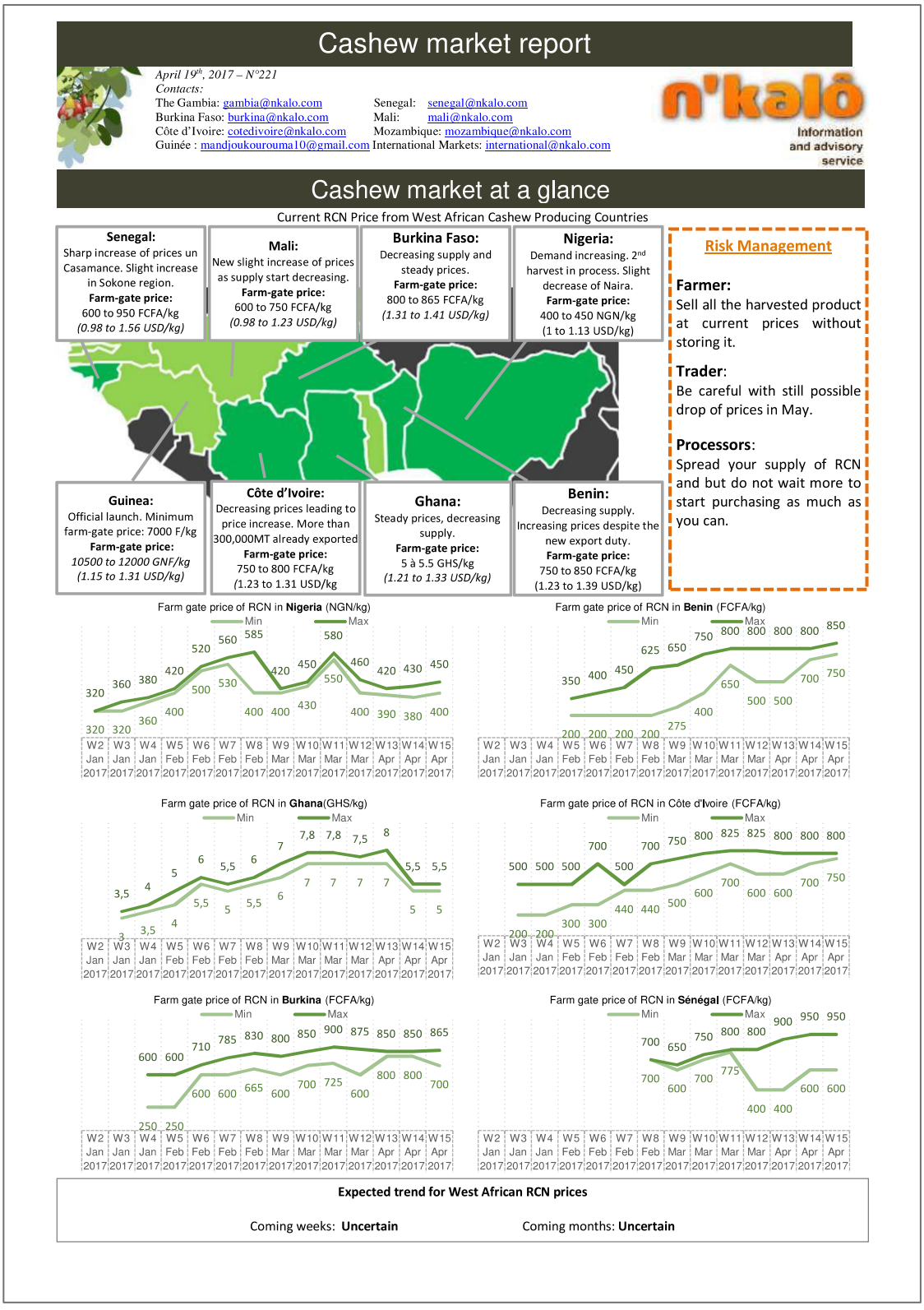
	2018	2019	2020	2021	2022	2023
Processing: possible utilization, as per current status (in MT of RCN)						
Medium	-	300	375	469	586	732
Small	160	256	410	655	1,049	1,678
New	-	2,500	4,000	4,000	4,000	4,000
Total processing (MT)	**160**	**3,056**	**4,785**	**5,124**	**5,635**	**6,410**
Trading: possible demand for RCN (in MT of RCN)						
Farmer groups	-	400	640	720	800	880
Traders	-	300	450	600	750	900
Total trading (MT)	**-**	**700**	**1,090**	**1,320**	**1,550**	**1,780**

Demand for finance estimation (US$)

	2018	2019	2020	2021	2022	2023
Processing	$147,200	$2,811,520	$4,401,832	$4,714,181	$5,183,752	$5,897,332
Trading	$-	$368,000	$588,800	$662,400	$736,000	$809,600
Production		$90,000	$127,500	$165,000	$270,000	$315,000
Total financing need	**$147,200**	**$3,269,520**	**$5,118,132**	**$5,541,581**	**$6,189,752**	**$7,021,932**

12.4 Regional market research samples

12.4.1 N'kalô



12.4.2 CashewInfo

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- Cashewinfo Market Summary
- Cashew Experts Market Commentaries–India and International
- Almond Report
- Domestic Prices of Nuts
- International Prices of Nuts

Released on January 29th, 2018

- Currency Movement and Outlook
- Health Benefits
- News Highlights
- Upcoming Trade Events