Big cashew trees

Photo credit: Kennedy Muthee/World Agroforestry

CHAPTER 7

Cashew: An emerging tree commodity in African drylands for livelihoods improvement and ecosystem restoration

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Highlights

- Africa is the major cashew nut producer (59% of global production) and exporter globally, with more than 15 countries involved and has great potential for resilient livelihoods and landscape restoration.
- However, benefits from cashew production remain low due to low productivity and value addition (exporting 98% of its produce as raw and unshelled cashew).
- A case study in The Gambia illustrates the potential of enhancing the economic, social and environmental benefits of cashew mainly through increased productivity and value addition.
- Innovative policies and incentives, investments in processing and marketing capacity, and diversification of cashew value chains (e.g., oils, bioenergy fuel) feature among urgent measures required to enhance the contributions of cashew to green economies in Africa in short to medium term.

1. Overview of cashew distribution in Africa

Cashew (*Anacardium occidentale* L.) is a tree species belonging to *Anacardiaceae* family that grows well in dryland ecosystems (Orwa et al 2009; Ohler 1979), as long as the minimum moisture supply is available. It is an evergreen tropical species with an average height of 12-14 m and is considered to be native to tropical America (Johnson 1973; Nair 2010; Bladzell 2000; Catarino et al 2015). It grows well in high-temperature zones with rainfall ranging from 500-3500 mm, below 1000 m above sea level. The first record of cashew growing in Africa dates back to at least the 18th century (Catarino et al 2015). Asogwa et al (2008), however, claim that cashew was grown in Nigeria as early as the 15th century for soil erosion control.

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Cashew is among the popular cash crops in the African continent, ranking third to hard nuts and almonds (MOFA 2007). It largely dominates the drier agroecology, where a shortage of moisture is prevalent (Bezerra et al 2007). The fact that the species can grow in such moisture-constrained environments makes it the most suitable cash crop for the millions living in this agroecology.

Africa produces more than half of the global Raw Cashew Nut (RCN) production. Data from FAOSTAT (FAO 2021) shows that only seventeen countries in Africa are engaged in cashew production. In 2019 alone, the continent produced about 2.33 million tons of RCN from an estimated harvest area of about 4.7 million ha, with an average productivity of about 0.57 tons/ha/year. According to FAO (2021) two-thirds of the total cashew production from Africa in 2019 came from just four countries - Côte d'Ivoire (34%), Burundi (12%), Tanzania (10%) and Benin (9%). Hence, any emphasis on improving the cashew related value chain should have the four countries onboard.

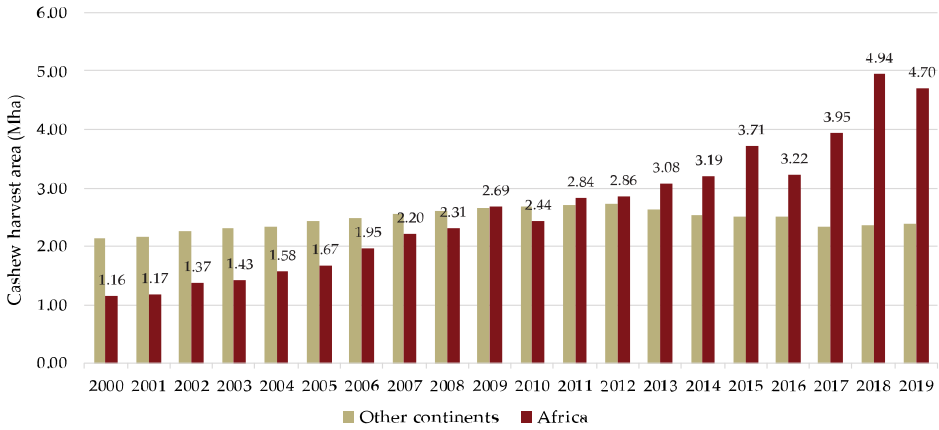


Figure 7.1: *Cashew harvest area in Africa*

The cashew harvest area in Africa has been increasing steadily over the years (Figure 7.1). As early as 2000, the continent only had a third of the global cashew harvest area. As of 2019, the continent had a cashew harvest area of almost twice all other parts of the world summed together. This drastic increase shows how the tree crop is gaining popularity in the continent. Figure 7.2 provides details of country-specific changes in some of the cashew growing areas in the African continent.

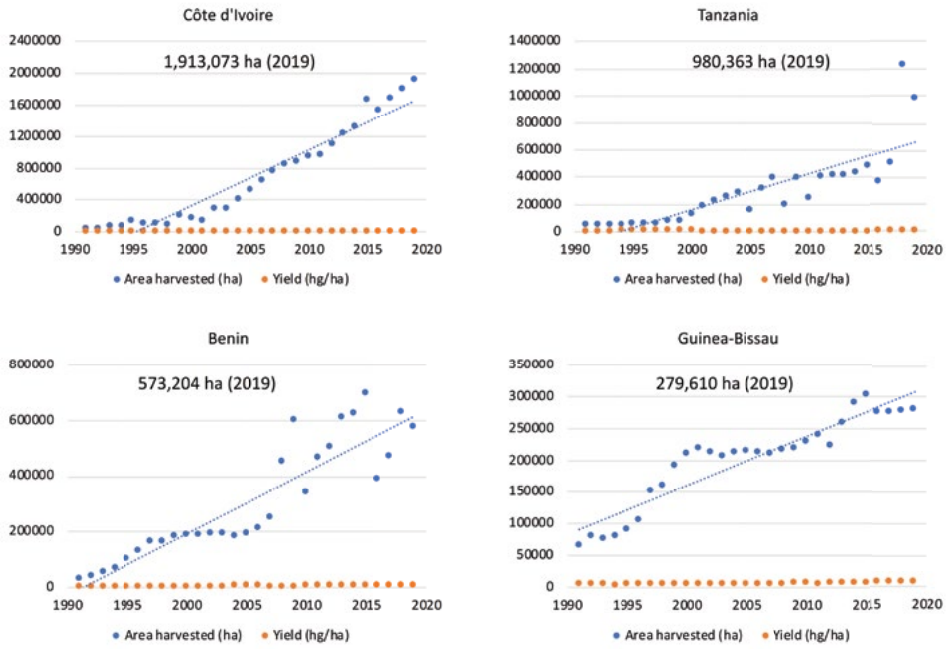
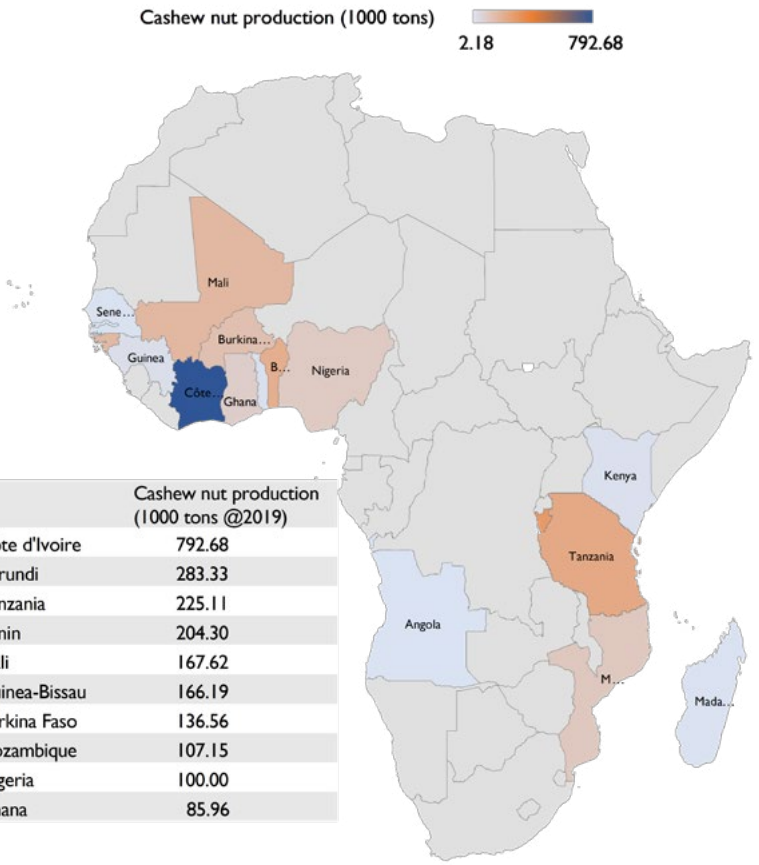


Figure 7.2: *The growing cashew harvest area in major producing countries. Note: Data retrieved from* FAOSTAT *Database on 14 February 2021 for RCN in various African countries.*

The literature on cashew commodity in Africa is rich but strongly focuses on the value chain development, market structure and functioning and government policy interventions. In this chapter, we highlight the potential contribution of this tree commodity for resilient livelihoods and ecosystem restoration in the face of climate change and land degradation in the African drylands. We demonstrate this with a case study from The Gambia. Finally, we summarise challenges facing the cashew commodity production and marketing in Africa and possible ways to maximize the potentials.

2. Cashew production and productivity in Africa

Over time, Africa's share of global cashew production rose from 47% in 2000 to 59% in 2019 – an increase of 12% in two decades. This follows a similar pattern of the continent's share of global cashew harvest area, which rose from 35% in 2000 to 66% in 2019 – with an increase of 31%. The production increase is much slower than the vastly expanding cashew growing area in the continent. The production of cashew in the continent is however concentrated in few countries (Figure 7.3).



	Cashew nut production (1000 tons @2019)
Côte d'Ivoire	792.68
Burundi	283.33
Tanzania	225.11
Benin	204.30
Mali	167.62
Guinea-Bissau	166.19
Burkina Faso	136.56
Mozambique	107.15
Nigeria	100.00
Ghana	85.96

Figure 7.3: *Cashew production volumes in Africa in 2019. Note the table indicates the top 10 cashew nut producing countries in Africa.*

The lag in production visa-a-vis harvest area increase from the continent can be explained by the low and stagnant yield in the main producing countries. Except for Mali and The Gambia, cashew yield, as per the available data, has not been showing any improvement since the 1990s. More so, there is a huge yield variability among the cashew producing countries in Africa (Figure 7.4). As much as 74% of the total cashew harvest area in the continent is from Benin, Tanzania and Côte d'Ivoire; their cashew nut productivity is still the lowest. Overall, much of the increase in production observed in the continent over time is through area expansion rather than any major changes in yield improvement of the cashew farms. As shown in Figure 7.2, for the four main countries with the growing and large areas allocated to cashew farming, yield over time has not shown considerable change. Lack of improved planting materials, aged trees, inadequate extension and training for skill and capacity building on improved agronomic practices and post-harvest handling challenges are among the contributing factors to low cashew nut yield in Africa (Martin et al 1997).

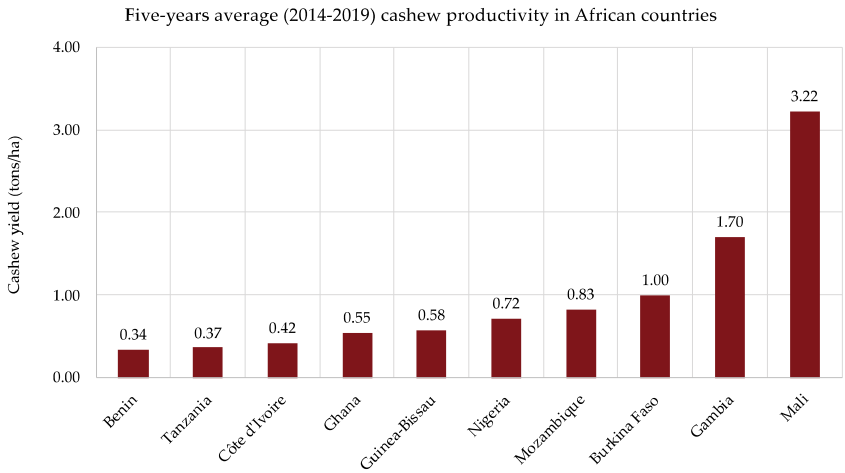


Figure 7.4: *Variability in raw cashew productivity among selected cashew producing African countries.*

3. Cashew nuts and the export market

The global demand for cashew is increasing and hence its production and export (Figure 7.5). Cashew is exported only in two forms: with shell and shelled. The first form is unshelled RCN exported after harvesting with no further processing except drying and packaging. Whereas the shelled cashew nut is semi-processed, i.e., the shell is removed and what is exported is the edible part, also called the kernel. Cashew nut shelling requires technology and skill to avoid harming humans due to the consumption of improperly processed cashew nut (Table 7.1). According to Nazneen (2004), the shell has an acidic oil that can burn human skin and produce toxic fumes when burnt.

Table 7.1: *Comparative attributes of exporting cashew shelled and with shell*

Comparative attributes	Exporting cashew with shell	Exporting shelled cashew
Market values	Low to medium	High
Resources - skills	Requires fewer skills	Requires specialized skills in cleaning, removing the shells and producing high-quality grade nuts.
Resources - infrastructure	Mainly requires careful collection of the cashew apples, separate RCN, drying and storing it.	Requires machinery that removes the shells with minimal damage to the nuts. The frequent challenge is that the shelling process is very traditional, and there is extensive damage to the nuts and hence low grades fetching low market prices.
Product quality issues	Well dried and no rotten nuts.	Highest quality standard is expected if it is to be exported shelled.

Comparative attributes	Exporting cashew with shell	Exporting shelled cashew
Market access	Lack of competition as the market is dominated by few actors, specifically India and Vietnam with dominant price-setting power.	Market access is difficult since there is some sort of market dominance established by few actors with competence and expertise. Market opportunities within Africa still exist, although not significant, but with some level of competition with those providing cheap and better-quality cashew nuts.
Co-benefits	For producer countries, the co-benefits will be low because of other useful products that could be extracted from the shell, such as cashew nut oil and energy-generating raw materials.	For producer countries, the co-benefits will be larger since the return from by-products can be retained.

Africa mainly exports RCN, which accounted for about 98% of cashew exports from the continent for the period of 2000 and 2019. This normally attracts less money than the shelled cashew nut, in which case the nut is separated from the shell and is ready for use (Kad et al 2017). Lack of capacity and competence for shelling cashew and weak investment in processing infrastructure, makes Africa to largely sell its product in its raw form, i.e., with shell (Ogunsina and Odugbenro 2005). Cashew is also dominantly produced by smallholder farmers who do not have the resources, skills and technology to process, package and sell it to the market. Figure 7.5 illustrates how Africa is lagging in cashew value addition efforts hence losing a large amount of money. Nonetheless, the growing value addition efforts in the continent may prove significantly beneficial to get the fair share of benefits arising from this important tree crop commodity.

Data from FAO (2021) reveals that, between 2000-2019, the average market value of shelled cashew from Africa was 3148 US$ per ton while the global average during the same period was about 5886 US$ per ton. Details are scanty as to why there is a huge margin between Africa and the global average. Most likely, it is because of the quality difference between kernel exported from Africa and other big exporters like Brazil, India and Vietnam. Compared to these countries, kernel exported from Africa is processed by small scale industries and local processors with low capacity and expertise, which can also affect kernel quality. Such price disparities may discourage investments in local value addition and price received by farmers, making the livelihood of smallholder producer communities vulnerable.

For African countries to increase the export share of processed cashew, there is a need for deliberate investment in the processing units (FAO 2013). Lieshout and Khan (2017) estimated that a processing plant with a capacity of 230 tons per year in The Gambia might cost about GMD 2.5 million. Unless the government or private sector invests in it, it may be too expensive for producer groups to set up. For the private sector to invest in the processing industry, there needs to be a sustainable supply of RCN to break even and make a profit. When such processing

plants may be too expensive to install or when enough RCN supply is not maintained, collectors may opt to export the raw nuts to other countries as there is already a high demand for RCN from countries such as India and Vietnam.

It is also important to note that the quality of nuts supplied by farmers plays an important role in determining export price and, ultimately, the price received by farmers (Basset et al 2018). African cashew nut suffers a lot from low quality as most of the nut is produced by smallholder farmers who have limited access to extension services and training on harvest and post-harvest agronomic practices that could help them to produce RCN of good quality. For best results, nut quality management should start from the time it is ripening on the tree. Best quality nuts should not be collected from the tree but should rather ripen on the tree, fall to the ground and be collected the same day of falling (Basset et al 2018). The separation of the nut from the cashew apple should also happen on the same day and should not be left for the next day or so. Then the nut should be dried for at least two days and stored using quality storage material. That means these activities are labour intensive. On the other hand, in many rural areas, labour availability for such daily meticulous care is scarce, especially when most young people migrate to urban areas. Farmers in rural areas are not given any training or technical support to ensure this quality to gain better benefits from their products, which is worrisome. In effect, one could categorize the production system as very traditional.

Among the key challenges in Africa is that the local cashew value chain is chaotic with a huge power imbalance. In most countries, the value chain is characterized by many intermediaries, including producers, local buyers, merchants, traders and exporters, making it extremely challenging for smallholder farmers to bargain on RCN price. In addition to this, there are well established and empowered foreign traders and exporters with strong acting power making it difficult for local traders to compete. For instance, in Cote d'Ivoire, Indonesian-based export firm OLAM plays strong price-setting power in the cashew value chain, making it difficult for other traders and exporters with limited capital and network of buyers (Bassett et al 2018).

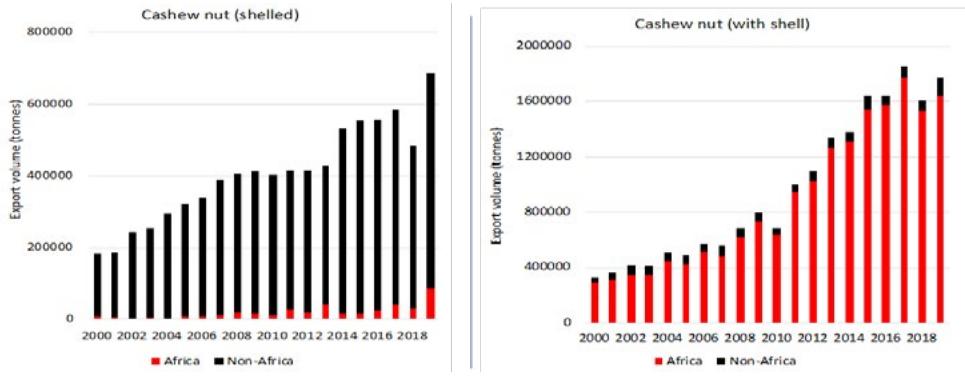


Figure 7.5: *Comparing export volumes from Africa against other parts of the world for the two forms of cashew products exported*

Cashew processing occurs in very few countries, with 97% of the global RCN export going to India and Vietnam (Figure 7.6). With Africa producing about 57% of the global raw cashew nut (average annual share of the production between 2009 and 2019), most of its produce directly goes to the major importer countries. On the contrary, the continent only has a share of 6.6% of the shelled cashew export. Such gaps may indicate an immense potential the continent has to develop the sector, but whether or not this would benefit its smallholder producers and other supply chain actors depends on the effectiveness of the interventions and how farmgate prices might change. For instance, the Tanzanian cashew sector is the most regulated cashew sector with the objective of enhancing value addition, local processing and improving earning at all sector levels, but despite this, it remains largely a producer of RCN for processing in Asia (Fitzpatrick 2012). The sector is also characterized by low productivity and low levels of value addition, as is the case in other African countries.

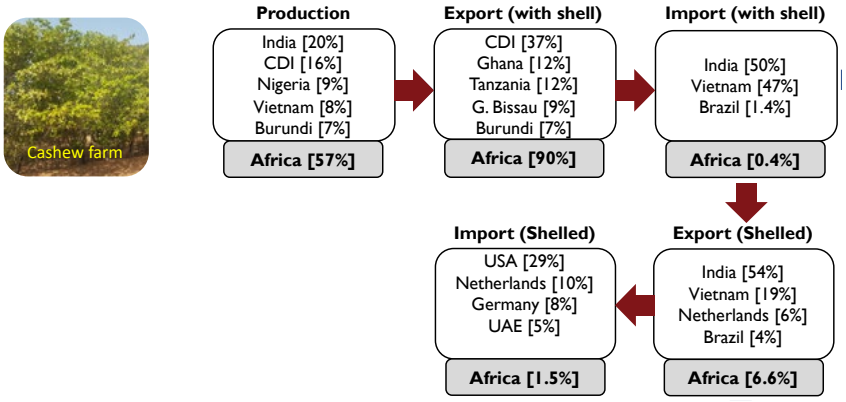


Figure 7.6: *The global overview of the cashew supply chain indicating the position of Africa relative to all key countries involved. The percentages are computed against a global value which is calculated by taking the average between 2009 and 2019. CDI stands for Côte d'Ivoire, UAE – United Arab Emirates, G. Bissau – Guinea Bissau*

4. Cashew emerging as an important agroforestry species: The Gambia case study

Various accounts confirm that cashew was (re)introduced into West Africa from India (Vellingiri and Thiyagarajan 2007) in the 1960s to promote agroforestry schemes that prevent desertification and reduce erosion. According to Hammed et al (2011), the species was selected for this purpose due to its ability to grow in unfavourable environments where moisture is scarce, and the state of soil is relatively poor. The efforts, at the time, to popularize the species paid off as it is currently among the widely demanded tree species in the country. Today, Cashew is one of the most important cash crops in The Gambia. It is believed that The Gambia is the 16th largest exporter of cashew lately (FAO 2013).

For a long time, various communities in the country has been practising cashew farming as the primary source of income. Perhaps, this priority by farmers may have been spurred by the ability of the species to thrive in the predominantly drier ecosystems. Besides, even at the local level, cashew has a good market for local consumption. Communities and households, especially those led by women, have ventured into small-scale processing and packaging of the cashew nuts for domestic consumption while men usually sell the cashew nut to collectors who, through their networks, avail the product to those exporting it. Though statistics on local consumption are scanty, the growing global demand for the crop impacts farmers' preference for the species.

A field survey was conducted by World Agroforestry (ICRAF) with 198 farmers in The Gambia in the Central River Region North (CRRN), Central River Region South (CRRS), Lower River Region (LRR) and Upper River Region (URR) on which species (tree crop) they prefer to grow as an agroforestry practice (Duguma et al 2020). Farmers voluntarily expressed their choices in view of their livelihood needs in the future. Of all the chosen species crops, cashew is the most demanded, followed by mango and gmelina (Figure 7.7). Cashew seedling demand is almost three times the demand for the two other most demanded species crops. Of the interviewed farmers however, only 19% (n=38) did not choose cashew to grow in the immediate future. The figure, however, varied by region – 19% in CRRN, 27% CRRS, 0% in LRR and, 16% in URR. Some of these farmers already have their own cashew farms, while some do not have land resources and the capacity to grow cashew. Nonetheless, the majority who wanted to grow cashew indicated that they do not even want a small number of seedlings – as high as 1866 seedlings per household which may cover an area close to 3 ha even if planted at an initial spacing of 4m by 4m.

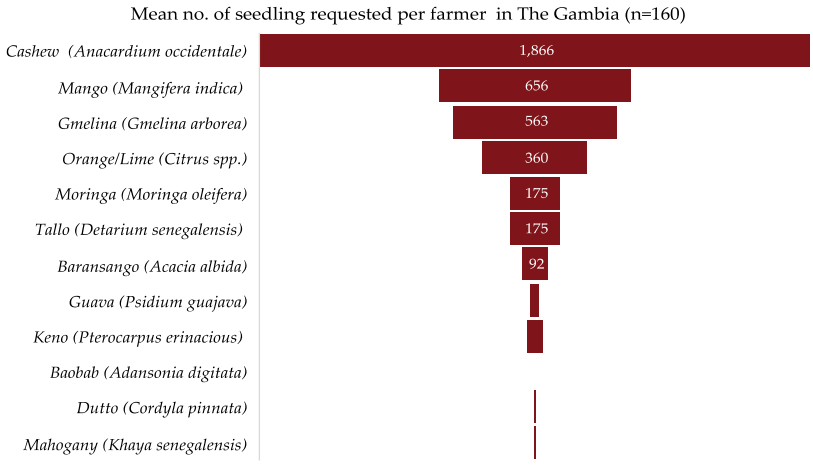


Figure 7.7: *Species choices by farmers and the relative preference for Cashew*

The farmers preferred growing the cashew at farm boundaries and as orchards (parcel of land with cashew as a plantation). The strong preference for the species was influenced by the adaptability of the species to the agroecology and the promising market available for the species both locally and internationally. Cashew is a vital agroforestry species that boosts ecosystem services with high socio-economic impact if widely spaced could reduce its suppressing effects on other crops and plants (Catarino et al 2016). The species, if grown on a narrow spacing, normally suffocates other plants grown in the same plot, hence justifying why many farmers prefer growing it as a stand-alone orchard or on the farm boundaries (Figure 7.8).

Given the harsh growing conditions of The Gambia and the intense constraints associated with the survival of planted seedlings such as fire, transhumanism, drought, etc., we assumed only 30% of the planted cashews could grow to become mature trees. Hence, of the 1866 tree seedlings planted, a farmer may succeed in having 560 trees. According to African Cashew Initiative (2010), in Ghana, a single cashew tree produces about 7-11 kg of RCN every year for about 15-20 years, though the tree can grow up to 50-60 years of age. However, in The Gambia, due to the constraining environmental conditions and poor tree management practices, the yield is about 5.6 kg per tree (Lieshout and Khan 2017). Thus, if the 560 trees are effectively grown, the total RCN production per year would be about 3.2 tons. Using an average market price of RCN at 85 GMD per kg (2017 value), the gross return to the household could be about 2.67 million GMD.

This is equivalent to a gross margin of US$ 17,422 per year at 2017 Purchasing Power Parity of 15.3. Assuming a 30% production cost, the net income per household per year would be US$ 12,195 or $33.4 per day. For an average family size of 8, the per capita income per day is about $4.2, which is way higher than the current international poverty line of $1.25 per person per day. This shows the potential role the sector could play to reduce poverty, hoping the global cashew demand continues, efficient market access by the poor and the climatic conditions also remain favourable (Government of The Gambia 2012). The area of land required to achieve this is less than 3 ha per household. In contrast, more than 6 ha is required to lift a household above the poverty line if improved agricultural technologies such as improved varieties of staple crops are used under rainfed agriculture (Harris 2014, Gassner et al 2019). If the raw cashew produced is processed and exported, the return for a farmer could even be higher.

The economic potential of cashew farming is also affirmed by Lieshout and Khan (2017), who in their economic analysis, concluded that cashew farming is a profitable venture for farmers with a return of GMD45,000 (US$ 900) per ha despite 40% postharvest losses. Thus, if a farmer manages to grow a hectare of cashew (100 trees at a spacing of 10m by 10m usual spacing) per individual member of the family, the per capita annual income will be already above the international poverty line.

4.1. Cashew as a strategic commodity crop for land restoration and livelihood improvement in drier ecosystems

The main intention of introducing cashew into Africa from India was to use it as a restoration species plant for degraded areas in drier agroecosystems. The ability of the species crop to thrive under difficult growing conditions makes it among the ideal ones for restoring ecosystems that are devoid of vegetation due to human exploitation (Hammed et al 2011). The similarity between the drier agroecosystems of India where cashew grows and the drier West Africa also made the species among the top for reforestation schemes besides its purpose as a commodity crop worth millions of dollars. Its drought tolerant characteristic (Malik and Bhadauria 2020) makes it among the ideal species for restoration in West Africa environments.

Among the main factors that create land degradation in The Gambia is wind erosion. In many areas, farmers are now adopting cashew as an important windbreak, especially in the Central River Region. This is because, once the cashew tree is established, it is evergreen and forms a thick canopy upwards. The canopy traps a huge volume of soil that is often blown away from the farms. In fact, the sediment deposition around cashew trees makes the soil around it richer. Hence, it may help the cashews grow better than other tree species that may not withstand the wind erosion pressure. The rows of cashew act as a shade in windy areas and attract domestic animals that come to the shade of the trees. These animals then deposit their waste under the cashew, especially during the dry season, making the soil around the cashew trees richer with nutrients. Cashew in such ecosystems also attracts birds, whose droppings are very rich in phosphorus; thus, creating a natural input mechanism to reduce the impact of phosphorus deficiency in the production systems. One of the most deficient macronutrients in African cropping systems is phosphorus and creating such natural input system is very crucial. Trees in such dry ecosystems are the best refugia for a variety of animal species hence bringing other benefits to the farmers and other land users.

Cashew's main introduction objectives in its early years in the continent also involved its use as a soil erosion control measure. Its canopy was believed to reduce the eroding power of the intense but short rainfall. Its roots also spread horizontally, gripping the soil in place when heavy rains hit and wash away the topsoil. Rao (1987) estimated that cashew trees (15-20 years old) intercepted about 31% of the storm rainfall in storms with ≤25 mm. It, therefore, plays a vital role in restoring the soils by reducing the impacts of eroding forces such as heavy rains. In Nigeria, cashew was planted on steep slopes to control soil erosion from as early as the 15th century (Asogwa et al 2008).

4.2. Cashew trees as live firebreaks

Cashew trees have a unique growing form, especially regarding their canopy structure. As indicated earlier, with its evergreen canopy, when planted at a narrower spacing suppresses most undergrowth hence limiting the fuel load under its canopy. This often leads the fire to be surface fire than growing into a canopy fire (Figure 7.8). Sousa et al (2015) observed that as the age of cashews increases, the density of undergrowth decreases. As far as there is no connection between the soil surface and the canopy, fire usually gets suppressed and extinguished on its own. That is why farmers in The Gambia, in particular, try to clean any living biomass that connects to the canopy from under the vegetation. This local practice has helped in retarding fire that could cause extensive damage. It is, however, important to note that the effectiveness of cashew nut as a fire retardant or fire break depends on how the trees are managed. Its effectiveness declines once understory vegetation density increases or if the cashew trees are not properly pruned to reduce branches extending to the group as it may create canopy fire.

The oil from the shell of the cashew nut is also reported to have flame retardant characteristic (Menon 1997; Blazdell 2000; Masood et al 2021) which adds to the fire suppression role this species plays especially in dryland ecosystems where fire is among the most important growth suppressing factors (Catarino et al 2015). Catarino et al (2015) reported that cashew trees are grown around forests to act as fire retardants in Guinea Bissau.

Figure 7.8: *Cashew trees planted along the farm boundary and a firebreak structure in The Gambia. (Photo: L. Duguma, ICRAF)*

4.3. Cashew sector as an employment vehicle

Lieshout and Khan (2017), in their analysis of The Gambian context found that to run an optimal processing plant with a processing capacity of 200 tons, there is a need for at least 40 FTEs (Full-time equivalent jobs) annually. About 11 FTEs will be directly operating the processing unit, equivalent to 23 FTEs for tree maintenance, and about 5.5. FTEs for

harvesting. If The Gambia decides to process 50% of its production volume of 2,780 tons (2019 estimate), it has the potential to generate close to 280 FTEs. This estimate, however, does not include the number of people that could be engaged in other value chains such as collectors, transporters, exporters, etc., which, if added, could increase the employment potential significantly.

If this is applied to the Africa level, assuming similar processing and labour market contexts, the FTEs generated by cashew could be higher. The continent produced close to 2 million tons of RCN annually between 2009 and 2019. With a processing unit similar to the one discussed for The Gambia, 40 FTEs per plant that processes 200 tons per year is achievable. Assuming that just half of the production could be processed, it can generate employment equivalent to 200,000 people. In a continent suffering from youth unemployment, such a single sector has the capacity to absorb the labour force of a fifth of a million annually. If the continent takes drastic measures of processing $^{2}/_{3}^{rd}$ of its cashew production, the employment contribution rises to 266,000 people annually (over a quarter of a million people).

5. What is the way forward for the cashew sector in Africa?

Perhaps, this is a difficult question to provide a clear and precise answer. Still, we try to highlight important interventions that the policymakers and donor organizations should consider in achieving the required outcome. For Africa to capture the wider benefits of cashew, some interventions are needed as soon as possible. This section highlights the main ones that could help build a strong case for cashew as the primary commodity for export earning, livelihood improvement and ecosystem restoration pathways.

5.1. Post-harvest loss management

Food insecurity is one of the major challenges Africa as a continent is facing. This is partly caused by the post-harvest food loss, which severely impacts the already threatened livelihoods (NEPAD 2013). Most farmers lack access to proper production technologies, and the erratic climatic conditions only exacerbate the situation. Post-harvest losses affect not only the food security but also the valuable farming inputs such as water, energy, capital, labour and may ultimately affect the economic growth of a country and the continent at large.

The cashew nut quality is of high importance, just like the kernel, which is the edible part of the nut. Wrinkled and discoloured nuts are not to be mixed with good quality nuts because they will not enter the market in that state. Cashew production in Africa is mostly carried

out by smallholder farmers who often use labour from their family members during the harvesting season to collect the nuts. This may lead to loss of nuts since they may be left in the field for a long time, thus deteriorating in quality due to exposure to extreme weather conditions (Palipane and Rolle 2008). Nut spoilage is likely to occur during transportation because the commodity has to travel a long distance from harvest to consumption (Pillai and Rolle 2008). For example, Lieshout and Khan (2017) found that in The Gambia post-harvest loss associated with cashew nut production is 40%, largely due to animal consumption, theft, and damage by free-roaming livestock. Tackling this would immediately increase the net return to the communities by 40%.

Avoiding such post-harvest losses and quality problems with cashew requires investing in continuous and strong technical support to the producer communities. Cashew farmers should be trained on the technical know-how required to process the cashew apple, which will reduce the apple spoilage on the farms. Mature cashew nuts must be picked daily to avoid spoilage on the farm. They should then be sun dried immediately on hard ground like concrete floors and well covered to prevent contamination. Proper storage methods should be used to avoid creating humid conditions that could potentially destroy the nuts. Freshly harvested nuts and dried nuts should not be stored with the old nuts since this may act as a source of insect infestation, mould (fungal) infection.

5.2. Value addition and valorisation of cashew by-products

It is crucial to encourage value addition of cashew apples to contribute to full utilization by mechanising the production processes to make them more efficient and sustainable. One of the main reason Africa exports RCN as opposed to processed ones, which fetches a higher price, is the lack of processing units. The financial sector and government agencies should devise credit strategies and tax holidays for communities that want to process and export processed cashew nuts. This adds value to the community and the government as the export value may increase at least in the long term. Doing so will also allow communities to use the nut shells, which could be transformed into other uses such as energy bricks, hence reducing pressure on the forests for firewood. Even engaging in energy bricks processing can create an employment opportunity for communities and especially the youth. It is also very important to note that pruned branches of cashew are high-calorie energy sources for heating, cooking and lighting. This, in turn, reduces pressure on forest and woodland itself. Cashew nut tree wood is also used widely for various construction uses. The wood has a relatively high density and is even referred to as white mahogany in Latin America (Orwa et al 2009).

Cashew nutshell has also become an important source of highly demanded products such as resins and adhesives for various uses. In Africa, the shells are just thrown away with no particular use. Taiwo (2015) indicated the very strong potential for cashew nut oil to be used as a key petrochemical feedstock. Other countries are investing in the extraction of polyphenols (Edoga et al 2006) from shells and bioethanol (Neelakandan and Usharani 2009) from cashew apples.

5.3. Policy measures on enhancing value capture

As indicated in the previous sections, Africa exports its cashew with almost no processing; therefore, the opportunity cost in terms of lost value and employment is very high. The only country where processing is picking up is Ghana; otherwise, all other countries focus on exporting it raw. Besides making the export value low, this raw export also creates a loss of potential by-products from the shell that many countries are focusing on to make the whole cashew sector highly valuable. Had the cashew nut got processed in the country or Africa, the by-products (e.g., cashew nutshell) valorisation could even create numerous job opportunities for local communities. This, however, needs investment and different support mechanisms from the respective country governments to valorise by-products from the cashew farms.

One of the main challenges with farmgate cashew prices is that prices are not regulated, and cashew farmers' gain is largely at the mercy of the collectors who go around collecting cashew nuts from their farms. There is a strong need for government agencies to put proper measures to determine the minimum price for producer farmers. Even with government intervention on setting the minimum price and licensing traders and exporters, effective enforcement may not be possible unless the government builds the necessary management capacity and governance mechanisms (Bassett et al 2018).

Current government support measures to encourage local processing (e.g., in Nigeria, Tanzania) could be strengthened through various policy incentives such as reduced taxation for processing plant establishment and export facilitation, credit facilitation and subsidy. Moreover, the current unstructured market arrangement in the cashew sector needs some policy guidelines to safeguard the prime producers, i.e., farmers against power imbalance. Though there is no guarantee that supporting local processing will increase the return to smallholder farmers, there is at least a justification that any additional benefit through processing could benefit the country in the long term through increased returns from the kernel export and processed by-product. Otherwise, the current motivation of farmers to grow cashew, as reported in the survey we conducted in The Gambia, and the potential of the sector to improve livelihood and landscape restoration may not be realized.

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