



Competitiveness of the Mozambican Cashew Industry

Mozambique



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Introduction

This report aims at providing a comprehensive view on the Status Quo of the Mozambican Cashew Nut Industry, its current key players on the private and public sector, its history and a brief evaluation of the policies that regulate the industry.

The document will also focus on mapping out the costs of Cashew processing in Mozambique, benchmarking the competitiveness of the industry.

This will be done through the analysis of key issues that the Mozambican Farmers and Processors face and revising the industry's revenues, costs and profitability from farmer through primary-processing and export.

It is the final objective of this analysis to indicate key gaps or weaknesses in the Mozambican sector, ultimately recommending priorities to be implemented by AICAJU's members and TechnoServe's management.

Methodology

For the writing of this report, the consultant analysed several documents on the past market and policy regulating the Mozambican Cashew industry and carried out several interviews with opinion makers, former and current industry professionals, industry technicians, policy makers, governmental entities and non-governmental industry stakeholders.

In addition to this, the consultant spent three weeks on the field, visiting Processing facilities, carrying out interviews "in-loco" with management and operations and interviewing Farmers, registering key issues and challenges on outgrowing, aggregating and marketing the crop to Processors.



Executive Summary

Following a period of 30 years of uncertainty, over the past decade the Mozambican Cashew industry has finally reversed this trend and is now on the path to success.

Despite this, the country's small holder producers and industrial processors face many challenges and attaining profitability constitutes a year-on-year struggle.

Small holders, who constitute the vast majority of producers, are heavily reliant on subsidies for production.

The government seedling and crop protection distribution program undermines the long-term prospects of the farmers regarding the crop as a commercial one.

This translates into farmers believing that inputs should be free and subsidized by the government, keeping them from self-invest in inputs and labour and having an investment/return type of reasoning.

On the other hand, issues also arise with the implementation of the programs at local level.

Inputs constantly arrive late in the season and are given by local staff to friends and family rather than to who really needs them.

Industrial processors face significant challenges from a limited infrastructure; high absenteeism on the factories; an inflexible labour law, and a costly and long export process. A volatile \$/mzn exchange rate further contributes for this uncertainty.

RCN purchasing prices also constitutes a problem as there are many informal traders with a very light structure and who smuggle RCN out of the country, allowing them to pay higher RCN prices to the farmers.

To off-set this, an 18% export tax on RCN has been in vigour since the beginning of the 2000's, but enforcement of this, remains challenging.

With regards to costs of production, factory gate RCN prices are estimated to be around 800\$/ton, placing Mozambique on a competitive position when compared to other processing countries.

Industrial labour is estimated to account for around 280\$/ton, a number higher than Mozambique's peers, driven on an inefficient labour force and with processors pointing out that could run the factories with 60% of the current staff, if absenteeism would be eradicated

Indirect costs represent 80\$/ton and the administrative process, costs of financing and depreciation add a further 94\$/ton.

Total production costs were estimated to be at around 1.255\$/ton resulting on a profit margin (before taxes) for industrial processors of 5% - 7,5%.

Mozambique's cashew nut value industry has great potential, but actions at a policy making level are required for the industry to thrive in the long-term.

The equilibrium between profitability and loss is still a thin one.



Mozambique's Cashew Nut

History

Cashew Nut was first introduced in Mozambique by the Portuguese, during colonial times, having reportedly reached its peak production with 240.000 tons a year, during the decade of the 70's.

By then, Mozambique was the largest producing country globally, responsible for roughly half of the world's production and with a processing capacity over 100.000 tons. This was the result of 20 years (1950-1970) of investment, in transforming a largely manual and scattered industry into a mechanized one, with 14 industrial processing players by the middle of the decade of the 70's.

Since then, the industry steadily declined during the colonial and civil war period, both in terms of production and processing capacity.

Mozambique reached its lowest level in production during the early 90's with only 22.000 tons of RCN produced in 1990.

In an attempt to curb the decline verified on processed volumes, immediately after the de-colonisation, the government imposed a ban on all exports of Raw Cashew Nut in 1978 which proved to have little effect on keeping the industry competitive, largely due to the change and transition in management of the plantations, the war and other social-economic factors.

With the end of the civil war, the government, pressured by the international community started to loosen up its Agricultural protection policies and started allowing limited RCN exports with heavy taxes over its FOB price.

Eventually in 1995, a full liberalization on the volumes traded of Cashew Nut was required, for the country to qualify for around \$400 million of a World Bank's loan assistance and the export tax was gradually lowered until 14%.

Five years later, due to a mix of the lagging effects of war on production and export policies, Mozambique processed a mere 8.000 tons of RCN in 2000.

Since then (2001) the level of the export tax was brought up to the 18%-22% interval and is set yearly accordingly to the market conditions.



Production

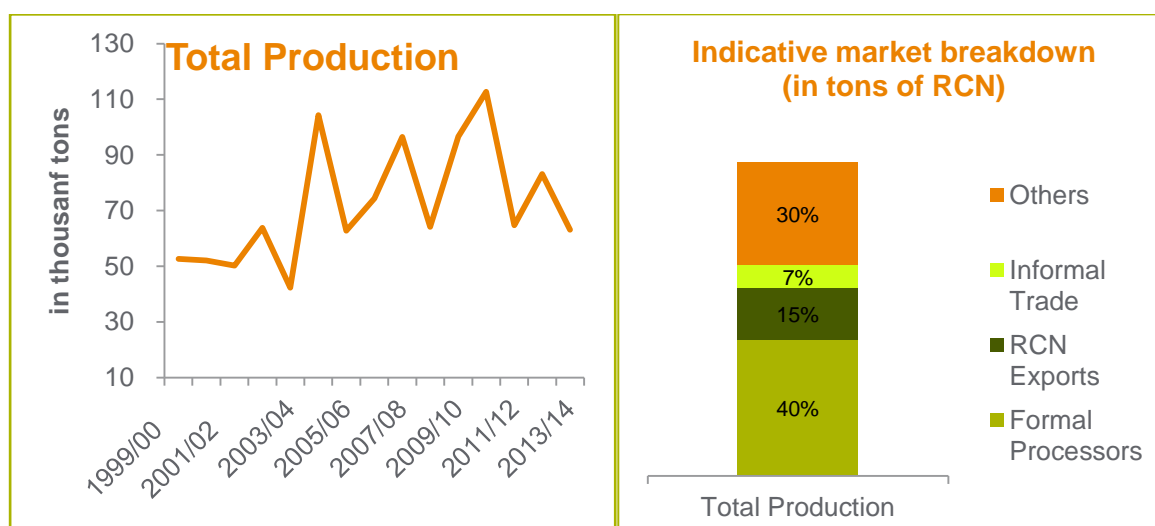
Mozambique is estimated to have a population of around 33 million trees mainly concentrated on the northern part of the country with the provinces of Nampula, Cabo Delgado and Zambézia accounting for roughly 60% of total production. The center and the south of the country account for 25% and 15%, respectively.

The difference in volumes is partly due to the fact that cashew production is regarded as a cash crop in the North and as a subsistence crop in the South, resulting on northern Mozambique’s farmers, placing more effort and investment on the crop. It is also estimated that self-consumption is substantially higher in the provinces of the south of the country and prices for RCN are typically lower, for a lack of a well-established commercial market.

Season	Total Production	RCN Exports	Industrial Purchases	Informal Purchases	Stocking / Losses	Others
2004/05	104,337	63,346	13,870	7,500	12,620	7,000
2005/06	62,821	26,349	21,943	4,397	7,539	2,593
2006/07	74,397	24,176	20,280	5,208	9,300	15,434
2007/08	96,500	31,607	24,000	6,755	12,063	22,076
2008/09	64,150	11,720	24,013	4,491	8,019	15,908
2009/10	96,557	27,923	26,616	6,759	12,070	23,190
2010/11	112,700	42,000	30,000	7,889	14,088	18,724
2011/12	64,731	5,595	25,400	4,531	8,091	21,114
2012/13	83,141	11,700	26,657	5,820	10,393	28,571
2013/14	63,081	7,188	17,717	4,416	7,885	25,875

Source: Incajú

Total official production volumes for 2014/15 were of around 83.000 tons, down from 110.000 tons produced in 2013. This was mainly driven by an atypical year in terms of rainfall and infrastructure damage which made difficult RCN purchases, in the right timing.





Source: Incajù

Estimated volumes for the season of 2015/16 are of around 100.000 tons of raw cashew nut which indicates an average production per tree of around 3 KG.

Inter-season volumes difference remains a challenge for the industry at large, impacting the players ability to plan and budget for price, volumes and purchase timing.

Processing

With regards to processing, Mozambique's production is largely concentrated in the north with 4 industrial processors, divided by 7 sites and accounting for around 32.000 tons of processed RCN.

Condor Nuts, a Nampula based group with two operating sites in Anchilo and Nametil; Cajú Ilha a Northern Mozambican group with two operating sites in Lumbo and Angoche; OLAM International a Singapore based agri-business group with an operating site in Monapo and another in Angoche and the Export Trading Group, a Tanzanian based soft commodity trader, with an operating site in Chiure and currently building a 3.500 ton facility in the outskirts of the city of Nampula.

On the central and southern provinces, there is currently only one 1000 ton/year, industrial processing facility operating, located in Morrumbene, Inhambane.

Several factories existed in Xai-Xai, Macia, Manica, Mandacate but closed in 2010-2012, following financial and management issues and the termination of an USAID program that supported these through providing the financial guarantees required by the banks for its purchasing activities.



Source: Incajù

Industrial purchases have accounted in the last couple of years for between 25% and 40% of total volumes produced. This is a tendency that is set to grow as players, currently have plans to increase capacity of existing sites.



Market

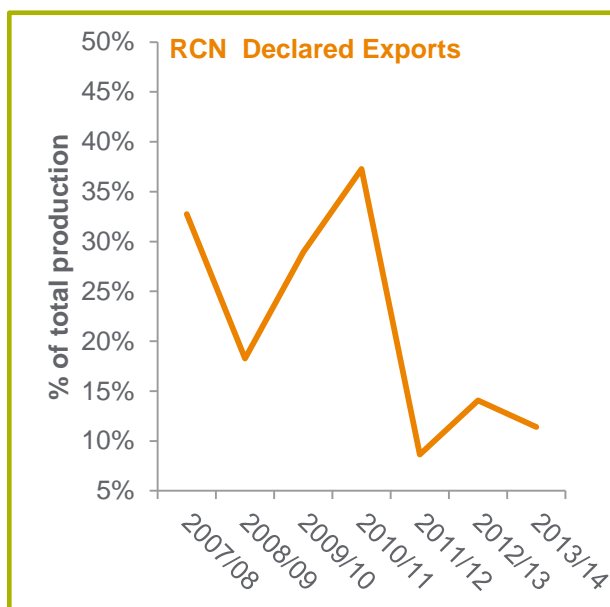
Raw Cashew Nuts

Mozambique's largest off-take for nuts varies from year to year.

Processors and traders usually manage the relation between RCN exports and locally processed, based on several factors being the most important the international market price for RCN and Kernel.

Asia is the main market for non-processed RCN, with India as the largest purchaser distantly followed by marginal sales to Vietnam. It is also estimated that there are significant flows of RCN to Tanzania, depending on season's price and availability of the neighboring country.

Declared exports have decreased over the last couple of years, partly driven by a local industry which has been absorbing more production. On the other hand, analyzing the table below, we can see that the category "Others" where undeclared RCN exports fall, has been rising sharply over the last couple of years. This suggests that the decrease on declared RCN might be off-set by illegal exports.



"Others" as a % of Total Production			
Season	Total Production (in tons)	Others (in tons)	Other as a % of Total
2004/05	104,337	7,000	7%
2005/06	62,821	2,593	4%
2006/07	74,397	15,434	21%
2007/08	96,500	22,076	23%
2008/09	64,150	15,908	25%
2009/10	96,557	23,190	24%
2010/11	112,700	18,724	17%
2011/12	64,731	21,114	33%
2012/13	83,141	28,571	34%
2013/14	63,081	25,875	41%

In an attempt to protect the local industry, the "Cashew Committee", a public/private decision group which regulates RCN exports in Mozambique, only allows exports at late stage of the campaign, to make room for the processors to secure raw material for the whole season.

Nevertheless there have been reports of Mozambican RCN arrivals in India, during the "no-exports" period, a clear suggestion that enforcement by the customs with regards to timing and taxing of the exported crop, is sub-optimal. Often, this delaying of exports in Mozambique also

reduces the value of its crop, holding it back until the crops in India and Vietnam are about to arrive.



Kernel Exports

The market for Mozambique’s industrially processed Cashew is mainly composed by the U.S., accounting for roughly 60% of purchases and western Europe for 35%.

Mozambique exports virtually all its industrial production leaving only 7% of its RCN to be processed informally and consumed locally.

Over the last couple of years, there has been a development of several small scale manufacturers in southern Mozambique, sourcing kernel from formal processors and aiming to supply the regional “premium” market of southern Mozambique and South Africa and also some exports to the U.S. and Europe.

Kernel Exports					
Year	Exported Kernels (tons)	Average price (\$/Kg)	Value (000\$)	Industrial Purchases (tons)	Kernel Exports as % of I. Purchases
2008	3,018	4.5	13,484	24,000	13%
2009	3,003	4.5	13,387	24,013	13%
2010	3,210	5.6	17,950	26,616	12%
2011	3,050	5.8	17,806	30,000	10%
2012	3,002	5.6	16,829	25,400	12%
2013	4,756	6.2	29,472	26,657	18%

Despite the growing tendency verified over the last couple of years on production and consequent purchases of the industrial processors, exported Kernel by volume has been growing at a slower pace suggesting a marginal buildup of stocks a moderate increase on processing capacity and significant RCN exports.

Informal Market, Stocking and Losses

As stated above Incaj , the government’s body which regulates the Cashew sector, estimates that informal trade is responsible for roughly 7% of the off-take of the crop in Mozambique.

Informal processors, generally women who purchase their raw material later in the season, generally for a higher price than mainstream traders, sell their crop on the roadside and local markets throughout the cities. Despite materiality of numbers, it is surprisingly challenging to find kernel available on several parts of the country, especially in the interior provinces.

The government also estimates that roughly 12% of total production is never marketed and lost due to lack of infrastructure and good post-harvest stewardship.

Early harvesting, inadequate storing, bad roads and lack of linkages to markets, all contribute towards this high number.

Government Support

Incaj , the National Cashew Institute (Instituto Nacional do Caj ) is the government, ministry of Agriculture’s body, which regulates the Cashew industry as a whole, in Mozambique.



Incajú's main areas of work are its chemical spraying assistance program; improved varieties seedling breeding and distribution, and general extension support to farmers, through the form of technical assistance to the crop (crop timing, pruning, treating, etc)

In 2015/16 campaign, Incajú is aiming at spraying more than 4,5 million trees, a 80m meticaís (\$2,2m) chemical program and to distribute more than 3 million seedlings to farmer's across the country.

Nevertheless, implementation and monitoring of these programs remains a challenge as the areas covered are vast, the production fields, scattered and accessibility is sub-optimal.

Both these programs are fully subsidized by the government and partly funded by the tax revenues of the 18% tax imposed in RCN exports.

Of the 50 million meticaís consigned from the RCN export tax of the 2014/15 season, 80% will be applied for production this season and the remaining 20% for support to the processing industry, namely through guarantees provided to commercial banks for processors purchases throughout the season.



Competitiveness Analysis

Farmer's Economics

Land

Land in Mozambique is state property and cannot be transferred to a third-party. On the other hand, developments, such as planted trees or other improvements to a piece of land, have transactional value and can be bought and sold. Despite the majority of the farmers not having their trees and improvements documented, the law states that if the farmer can prove to the community that him or his ancestors have been farming a specific piece of land or if that land has not been in use by its current tenant to the right ends, then he can legally pursue the right to use the land for his own.

This lack of formality coupled with the sense of insecurity triggered by the lack of documentation of land ownership, results that despite there is no significant impact for production by the local community, this disables the farmer to use its assets to their full potential such as collateral for finance. This also contributes to a lack of a liquid real-estate market and consequent outside investor interest.

The majority of Cashew farmers in Mozambique do not farm Cashew as their main crop, relying on Maize, Beans, Millet and Cassava as their main income and therefore placing less than desired attention into the crop. It is also common to row inter-crop these with Cashew trees, what usually results in a dispute of nutrients between the various crops, consequently lowering the output.

Several farmers either inherited their plantations from their parents or historically gained access to these through adverse possession following the de-colonization period redistribution.

They have then planted new areas with the help of Incajú's planting program, but substitution of old, unproductive ones remains an issue due to the affective relationship with the old trees.

When assessing land value besides the concept between tree and output, the Mozambican farmer also takes into consideration other social-economic factors such as, proximity to the community, water, familiar history and shadow produced by the trees.

Due to the lack of a liquid market, and the fact that so many Cashew trees are planted in marginal lands, it remains challenging to attribute a price to land in Northern Mozambique.

- Estimates from different real estate consultants are between \$250 – \$500 per hectare for purposes of sale but for this report, no cost is attributed to land.

Inputs

Crop input investment remains low in Mozambique. This is driven by a general lack of understanding of the concept between investment and return, access to commercial input distribution in remote areas, lack of disposable income/savings to invest, inappropriate crop protection packaging size, and



general willingness of the farmer to “self-invest” in inputs driven by factors such as government’s fully subsidized spray program and seedling distribution program and the passive attitude of farmers towards the crop.

Despite efforts from the government and non-governmental organizations such as Mozacajú, only around 10% to 15% of the trees get sprayed. For the purpose of calculations we will assume an average production of the sprayed trees if of 3kg per each one.

Crop Protection

The recommended spray program by Incaju’s officials per tree consists in four applications as per below:

1. Fungicide (10 ml) + Insecticide (5 ml) + Copper Oxichloride (5 gr) (moment - T0)
2. Copper Oxicloret (5 gr) (T+10)
3. Fungicide (10 ml) + Copper Oxicloret (5 gr) (T+21)
4. Fungicide (10 ml) + Insecticide (5 ml) + Copper Oxichloridet (5 gr) (T+42)

Following an enquiry to the only company currently supplying the above, an average retail price of 34 MZN (\$1) per tree or \$0.33 per kg of RCN was calculated, for the four applications. Nevertheless the majority of the northern Mozambican farmers does follow through with the 4 applications as so, we shall assume a value of 15 MZN (0.4\$) per sprayed tree.

Seedlings

Incajú is currently aiming at distributing an equivalent number of 10% - 15% of total Mozambican Cashew tree population every year, with a scheduled 3.5m trees to be distributed on the season of 2015/16.

Despite these efforts, monitoring if the distributed trees are actually planted and timely distribution of these, remains a challenge.

Technoserve’s Mozacajú also has a program of seedling distribution of around 400.000 new trees by 2016.

New seedlings planted in Mozambique are in their majority, a product of these two, fully subsidized programs.

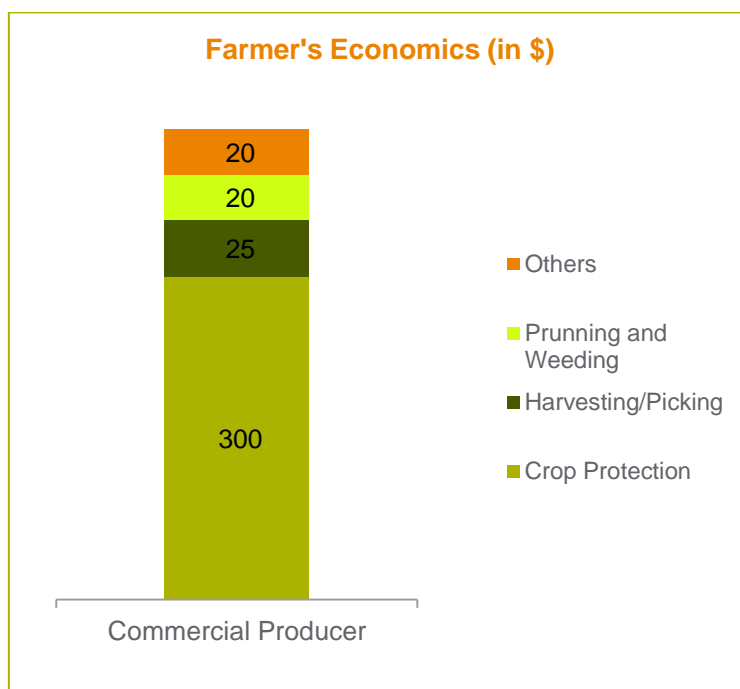
- Distribution of inputs (C.P. and Seeds) are on their majority subsidized by the Mozambican government therefore are not considered as relevant for computing the costs of the farmer.



Labor

Labor cost on the agriculture sector in Mozambique is very elastic with the majority of farmers doing the work themselves and with elements of their household, rather than hires.

Although the minimum legal wage for the sector is of around \$120 a month, remuneration, when exists, remains highly informal with a system of exchange of goods or other services, for work, what constitutes a challenge when computing the labor costs of the Cashew crop. Wages also tend to be negotiated per task rather than per unit of time.



The breakdown of the gathered estimated labor costs were the following:

Crop Protection Application

Crop Protection application tends to be hired out, since it requires the usage of a machine and fuel. Application of chemicals with an atomizer machine, run at an average price of 10 MTN (\$0.3) per tree, with the use of the machine and consumables included.

As stated above, a typical spraying program requires 3 applications, adding around \$1 of cost per tree.

Pruning and Weeding

Despite Mozambique ageing tree population, and efforts from Incajú and non-governmental programs such as Mozacajú, pruning and weeding occurs less frequently than desired.

Estimates point out that farmers only prune or weed 10% - 20% of their trees on a yearly basis.

Labor price per weeded tree is of around 10 - 20 MTN (\$0.3 – \$0.5) depending on the area.

Picking and Harvesting

Due to the high workload that generates and to the relatively short window of time, picking/harvesting usually involves third party hires. Accordingly to research, the cost of picking ranges 0.55 MTN/KG (50MTN per 90KG bag) and 3 MTN per KG (\$0.015 – \$0.085), depending on location and other alternative sources of income, available.

- Total estimated labor costs of Crop Protection application, pruning, weeding and harvesting add to around \$345 per ton.



Transport and aggregation

Much of the Cashew in Mozambique is grown on marginal land and many times in remote and difficult to access locations.

While many traders have well-established purchasing points on the side of the main roads and important producing centres/towns, marketing the crop to these points is a challenge for small holders, whom the majority of times have no motorized mean of transport and carry the 90 KG bags by foot or bicycle.

Efforts have been made to overcome these issues, mainly through training the farmers to aggregate their crop into volumes that make it worth for a truck pick-up.

Technoserve's Mozacajú is developing a mobile phone application which provides information on volumes ready to be marketed and their locations, allowing mid-traders which currently rely on word-of-mouth, to organize pick-ups in accordance to the volumes produced in a certain radius.

Information gathered through interviews with the farmers show that transport from farm to market adds about 0.75 MTN per KG (\$0.02).

- Total estimated costs for “others”, including farmer aggregation costs add \$20 of cost per ton.



Purchasing Prices

Price

Prices paid to the producer are volatile from year to year with several factors influencing it, besides the international price for kernel, RCN, and the MZN/USD exchange rate.

Typically, negative cost variances in the value chain, such as higher prices of fuel or charges on the export administrative process; tend to get passed in a large degree to small holders, eroding their margins to a larger extent than any other stakeholder.

Informal intermediaries such as the local community leaders which frequently tend to be the aggregators of the crop, also contribute to a higher cost of raw material as it gets more common to get paid for these kinds of services.

Historically, the decolonization period was followed by a time of price instability, and in an attempt to control prices the government imposed a fixed price paid to the producer, which was kept in practice until 1987. From 1987 to 1998 the government changed the policy to a minimum price, eventually liberalizing prices in 1998 until now.

RCN domestic price is a central point on keeping the industry competitive. In this direction, there is currently a proposal from Incajú for the introduction of a reference price to be paid to the producer, set under the form of an interval. Approval of this policy is due for the campaign on 2015/16.

Price paid to farmer			
Year	Average price (mzn/kg)	Average exchange rate (mzn/\$)	Average price per ton (\$)
2009	8.7	26.6	328
2010	14.5	34.7	419
2011	19.0	27.5	691
2012	13.7	27	506
2013	12.5	30	417
2014	16.1	32	503

Source: INCAJÚ & Banco de Moçambique

Other stakeholder practices such as the lack of physical structure and tax/licenses evasion methods from informal RCN exporters, also contribute to a volatile market.

These traders, which generally have good mastery of the “cut and test” practice, tend to have a better sense of where quality RCN is grown. This allows them to pay higher prices (for higher quality nuts), what generally has a price spillover effect, inflating the rest of market.

- The current (2015) exchange rate is of around 39 MZN/\$. Despite this rise in the exchange rate happened towards the end of the purchasing season, for the purpose of this report, average price paid to the farmer in 2015 was estimated to be around \$700 per ton of RCN.



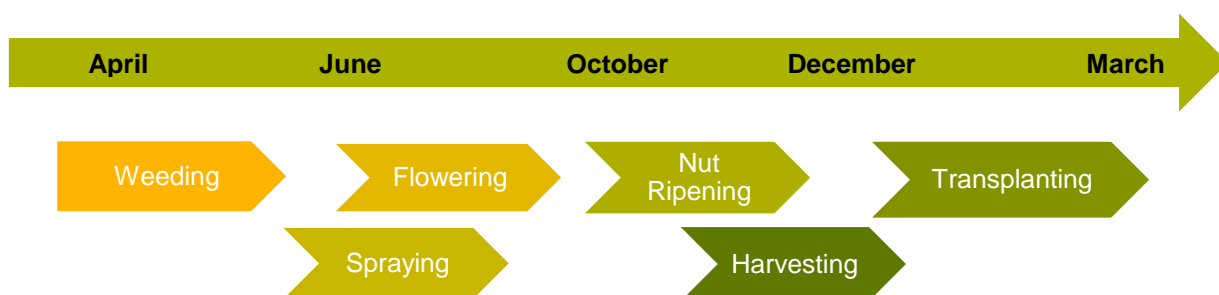
Crop timing (micro)

Flowering in Mozambique happens on the months from June to August overlapping the spraying season that usually occurs in the very early stages of flowering.

Weeding generally happens on the prior 3 months of flowering, from April to May.

Nuts get ripe in the months between October and December and harvesting/picking occurs simultaneously with the marketing of the crop, frequently running into January.

Plantation of new areas and transplantation of seedlings happen during the raining season that can run from anytime between mid-November and mid-March.



Quality (KOR and moisture)

Quality of Kernel and RCN in Mozambique is lower than the Asian and comparable to other peer countries of East Africa, with post-harvest handling remaining the main issue in country due to the low technical skills and access to infra-structure, of the Mozambican farmers.

Different studies point out to a Kernel Outturn Ratio, of around 42 - 48 pounds of kernel per bag of 80kg of RCN. These numbers place Mozambique on the lower end of the continent, significantly lower than Tanzania (48-52) and slightly below Cote d'Ivoire (44-49).

Quality issues can be generally attributed to four main points:

1. Picking the fruits from the trees, while still on development and not ripe for processing
2. Leaving the fruits for too long on the ground, at the mercy of insects, high humidity and funguses and degrading the quality of the RCN
3. Lack of proper drying to a 8% to 10% moisture content before storing and packing for marketing
4. Lack of proper stocking in "sweatable" jute bags, that allow the RCN to breathe, coupled with long lead times from farmer to factory

Bagging

Export traders and processors; distribute jute bags every season by contract traders, farmers and cooperatives for later re-purchase.

Although, cost wise, bagging is considered a processing cost, process wise, it's considered responsibility of the farmer since correct drying and bagging has a great impact on the crop's quality and price.



Bagging of nuts with the incorrect moist level on “non-sweat able” bags , and long stocking of RCN under less than optimal conditions (moisture + CNSL) lead to harder to process nuts (difficult to peel), thus higher % of breakages, ultimately impacting profitability.

- The estimated cost that bagging adds to the total cost of a ton of processed RCN is of around \$12 per ton.

Transport and field logistics

Much of the Cashew in Mozambique is grown on marginal land and in remote and difficult to access locations. For these reasons, marketing of RCN from farm to factory is somewhat of a longer than desired process, with several bottlenecks, middlemen and other inefficiencies that sometimes inevitably add non-value added costs to the process.

Due to the remoteness of farms and scattered production, which makes hard for large trailers to get the job done, production is usually aggregated by smaller 4 and 6 tonner trucks, than then transport it to the main roads.

Despite RCN purchasing requiring a license from the ministry of Agriculture, bush trading remains a vast and unregulated activity.

Aggregation and purchasing players of RCN in Mozambique can be generally divided into 4 different groups:

Aggregators

Generally the first link of farmers to the market, consist on community leaders and influencers such as the local traditional powers (regulos and mwenes) that aggregate production in batches and link to outside of the community traders, over mobile phone or word-of-mouth. These are generally farmers themselves that have a solid idea about market prices paid in other communities and information on volumes produced within their communities.

Informal Traders

Bush traders based on the side of the road and strategic bush villages, many times from Asian origin, with small or no structure - rented trucks specifically for the purchasing season, and taking an opportunistic and eruptive approach to the market.

These traders generally sell their crop to RCN exporters in the ports of northern Mozambique and are characterized by operating below the radar and without the necessary legal licenses to do so. This constitutes an issue for the ministry of Agriculture as their operations remain largely unknown and unaccounted for in the national statistics.

Formal Traders

Registered traders, usually operating on several crops from Maize and Beans to Cashew, such as the local “Companhias Comerciais” and other sub-contracted purchasers for the industrial players. Industrial players outsource part of their purchases, frequently opening lines of credit to smaller traders of trust in an open-book off-taking agreement.

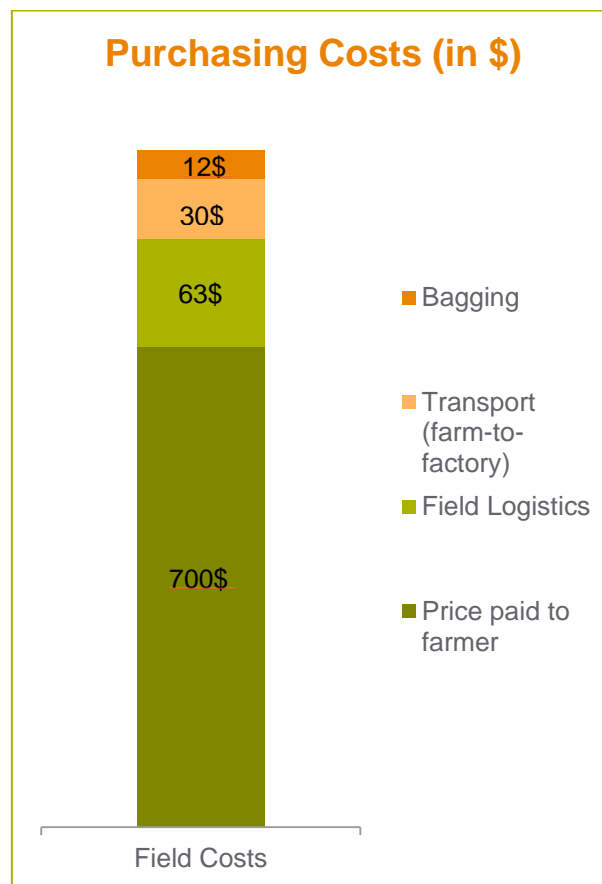


Processing players

The purchasing teams of the processing units, composed by managers and field supervisors, as well as purchasing technicians that supervise activities and have their own strategic purchasing points.

- It is estimated that the average cost of transport from farm to factory is of around \$30 per processed RCN ton and that the rest of the field logistics add \$63/ton to the process.

Purchasing Economics Graph





Processing Costs

Direct Labor Costs

Process technology in Mozambique is similar to the ones found in other African and Asian countries, remaining a process, highly dependent on manual labor in particular for the de-shelling, peeling and grading steps of production.

Impact of social-economic factors on labor productivity such as lack of a long-term attitude towards maintenance of a work source; responsibility and commitment to a steady job; alcoholism; other alternative sources of income in the region; and general lack of ambition for material goods, have a high impact on workers' absenteeism and consequently the lack of ability to plan output volumes and lead times by the processors.

This, together with low labor output efficiency, constitutes one of the main operational problems faced by northern Mozambique processors.

In an attempt to off-set this problem, workers of the highly manual dependent sections, are generally paid in accordance to their output and incentivized to increase efficiency through different bonus and productivity schemes.

Direct labor costs constitute the main “cost chunk” of the industrial process and it is estimated to account for about \$280 per each ton of processed raw cashew nut.

Research shows that **warehousing**, the receiving the RCN straight from the field, consequent de-bagging, natural drying, handling and calibrating / re-assembling by calibers, adds around \$6 to \$7 of cost per each processed ton of RCN. **Calibration** of nuts is done by automatic roll machines, but due to the lack of loading augers, feeding of its hoppers, remains a manual process.

Moving the RCN from the warehouse to the steam-boiler, is a manual process, generally done by walking and with jute bags. Consequent **steam-boiling** is estimated to add around \$3 per ton of processed RCN.

These production steps account for around 2% - 3% of all factory labor.

In an attempt to reduce dependence on labor, **de-shelling** automatic machines have been introduced in the Mozambican industry over the last years. Still, cutting as a function still accounts for over 45% of total workers on the average factory.

Issues with kernel breakages, long stoppage times to tune-up the machines for different grades, and a technology that despite to a lesser degree, still requires a lot of manual inputs, results on the process remaining in its vast majority a manual one and the industrial process “bottleneck” in terms of output volumes.

The majority of the automatic machines working in northern Mozambique, also present a higher breakage ratio (<10%) than manual “de-shellers” at around 9%.



Cashew Nut Processor Competitiveness Analysis – Mozambique

Alongside with this, severe issues with absenteeism and labor efficiency exist, based due to the reasons presented above.

Schemes to incentivize workers to show up such increasingly such as free breakfast and lunch for the workers and others are some of the measures that have been put in place.

Worker kernel output is also an issue on this step of production with an average output of less than 10kg of kernel per worker per day.

It is estimated that labor costs of de-shelling are of around \$125 per ton of processed RCN.

Despite its low labor input (2% of total factory workers), **drying** constitutes an important step of the processing chain, as incorrect baking, results on difficulties and added time later in the process for peelers.

In Mozambique it is estimated that moving the kernel and loading and unloading of ovens accounts for \$3 in labor, per ton of RCN.

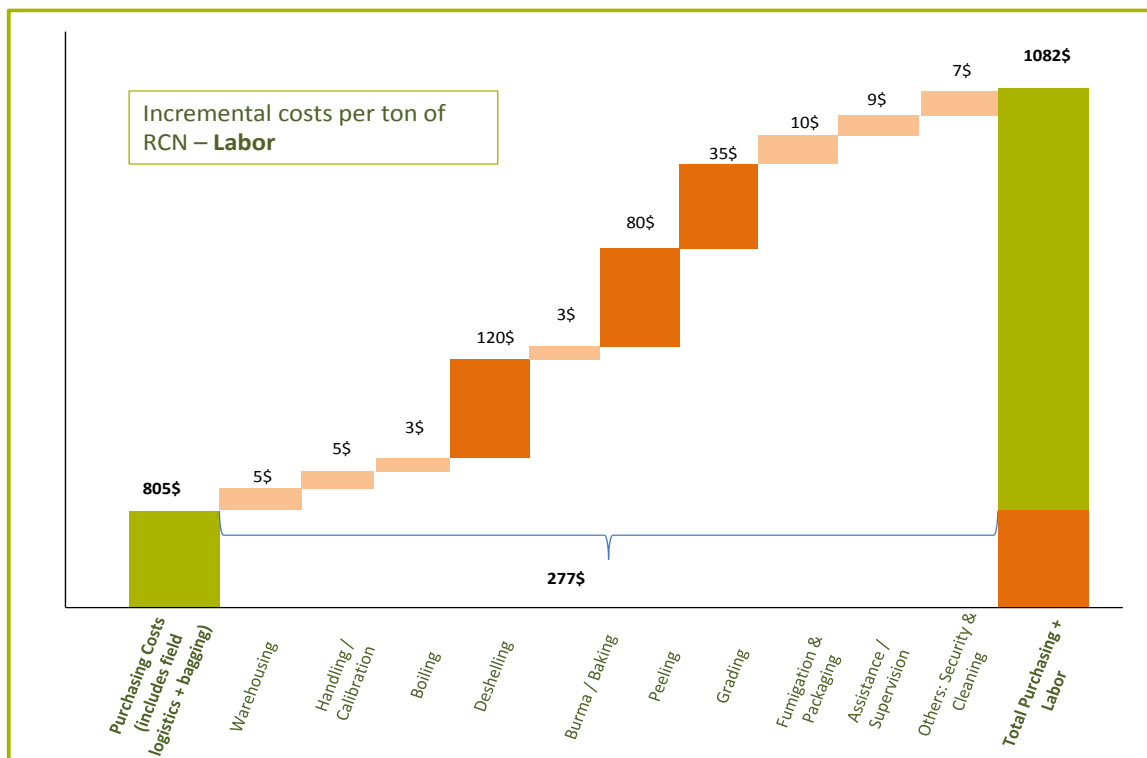
Regarding man power in **peeling**, the second largest cost contributor to the industrial process, it is estimated to add \$80 of labor per ton of RCN, with 35% of all manpower.

Grading on its turn, accounts for \$37 per ton and 15% of total manpower, resulting in a combined cost of around \$130 per ton for the two sections.

Both peeling and grading are highly dependent on manual labor and are generally done by women, On all these steps, absenteeism constitutes the greatest challenge for processors who throughout the years, have put out additional means to incentivize workers to show up, such as providing day child care and food for the factory workers.

Finally, movement of the kernel in and out of **fumigation** chambers and consequent **packaging** accounts for \$4 per ton and 3% of all factory workers.

Indirect labor costs with site **security** and **technical assistance** account for \$7.





Indirect Costs

Indirect processing costs in Mozambique are generally high when compared to other countries. This is mainly driven by the absence of a solid supply chain and domestic production of goods and third party services required for the good functioning of the process.

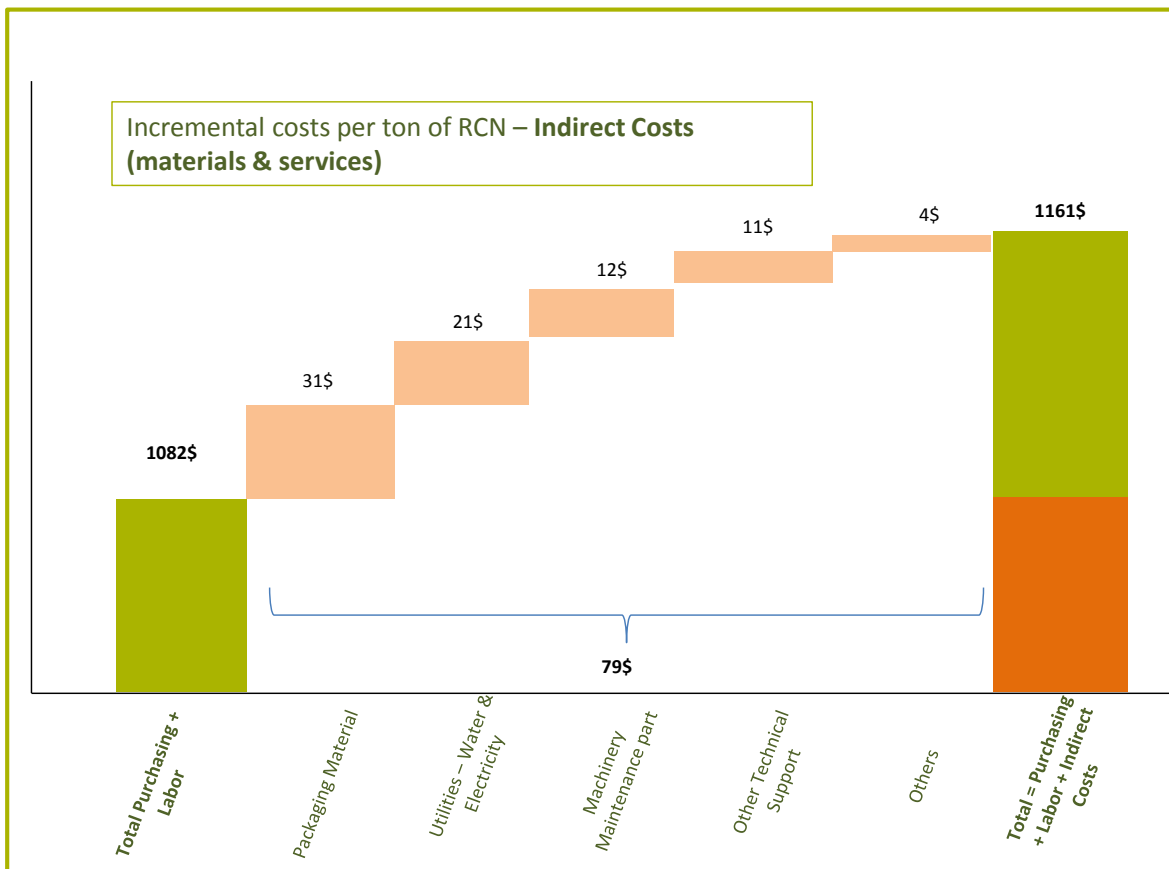
Bad road infrastructure, high fuel costs, expensive parts and thefts make freight rate expensive; long distances, high import taxes and inefficient customs services, make indirect raw materials costly and the weak utility infrastructure results in power cuts and in processors having to rely on its own emergency power suppliers for their operations.

Finally, driven by high import costs and long lead times, spare parts for the mechanical functioning of the process, are difficult to find in Mozambique, frequently having to be flown from South Africa or even India.

Estimated costs for indirect activities are estimated as follows:

Imputed cost per ton of RCN processed, of **Packaging Material** (plastic film and carton boxes) is of around \$30.

Utilities such as water and electricity account for around \$20 of cost per ton, and **Machinery Maintenance, Technical Support and Others** for around \$27 of cost per ton.





Logistics and Export

Due to its geographical proximity to all processor's facilities, the vast majority of the northern Mozambican kernel is exported through the Nacala port as despite significant constraints, remains the most economically viable port.

Accordingly to research the port is one of the most expensive ports to operate out of, working constantly in over capacity and with significant bottlenecks in terms of ship loading and tariff barriers.

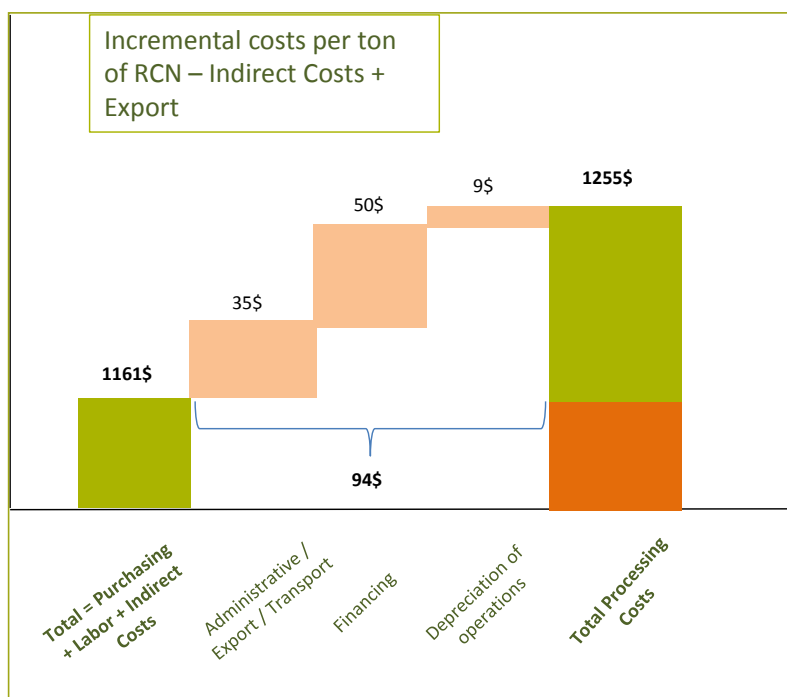
In recent times, a second mandatory physical verification process step denominated by TEEN (Nacala's Special Export Terminal) was added, generating controversy among exporters as the step constitutes a non-value added activity, adding significant costs to the export process, both through the fees of the service and the extra transport costs required for transporting the containers in and out of this terminal.

Admin export costs, **transport from factory to port** and **customs clearance process** (TEEN & Kudumba) are estimated to add around \$45 - \$65 per ton of RCN processed.

Others – Financing and Amortization of equipment

Sources of financing of net working capital for processing operations are generally a mix between local commercial banks, parent/sister company offshore lines of credit and own capital.

The northern Mozambican cashew industry is generally characterized for being part of larger groups of companies ranging from



agricultural trading, to general commerce and construction.

Credit lines for raw material purchases and indirect costs are usually contracted in U.S. dollars rather than local currency as a means of edging for revenue currency fluctuations (in \$).

Guaranteed by USAID, BCI, the Mozambican Banco Comercial e de Investimentos, has a credit line with special terms for the cashew industry. It is estimated that the rates provided to the industry range between **LIBOR + 6% - 10%**. The ability to raise

financing offshore and from sources of cheaper capital, has great impact on processors' profitability. Current financing costs account for around 70\$ per ton of RCN, a number which represents over 5% of total processing costs.

It is also estimated that depreciation of machinery and equipment of the operations account for an additional \$7/ton of processed RCN.



Revenue (Kernel) & Profit

Despite having an outturn yield lower than some of its peers, the reflection of being in counter-cycle on prices, has in the last couple of years, generally off-set these differences in terms of total revenue per unit.

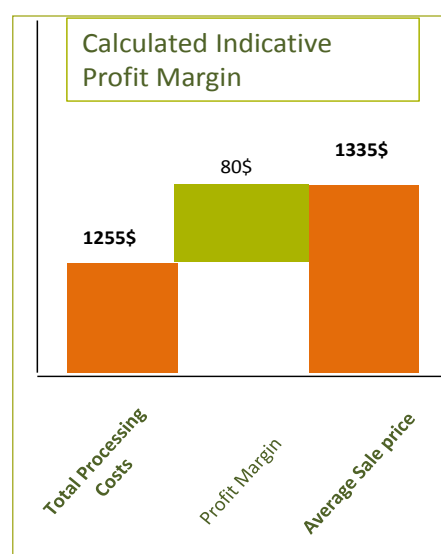
Being responsible for around 25% of the global production the southern hemisphere crop usually reflect higher prices, generally pushed by different factors such as need for Indian and Vietnamese factories of keep running, to pay salaries and retain skilled workers.

The table below shows the average estimate prices per ton of the Mozambican industry for the season of 2014/15:

Revenue per ton				
Grades	Average \$ price per pound	Production	Proportion \$ (lbs.)	Contribution \$ (ton)
Wholes				
> W320	4.20	8.8%	0.33	736
W 320	3.31	34.7%	1.15	2,529
W 450	3.12	10.6%	0.33	726
SW	3.30	10.8%	0.33	737
Others (SSW &DW)	2.60	3.0%	0.08	172
Sub Total	3.31	67.9%	2.22	4,900
Pieces				
LWP	1.81	12.0%	0.22	480
Others	1.70	20.1%	0.38	839
Sub Total	1.76	32.2%	0.60	1,319
Total		100%	2.81	6,219

The table shows that each ton of kernel represents a turnover of around \$6.200 for the average northern Mozambican processors.

Assuming a RCN to Kernel Output Ratio of 21%, this translates into a revenue of **\$1.306** per each ton of RCN processed, and on its turn a profit of around **\$80** per processed ton.





Issues and Recommendations

A Competitive RCN internal Market

Evolution of RCN purchasing prices in Mozambique has seen a significant surge in the last couple of years.

As described before, this is driven by several factors, from higher international commodity prices; lack of RCN aggregation methods; more middle traders adding cost layers between farmers and processors; and other informal traders whose lack of structure and evasive methods to pay of tax or licenses, allows them to pay higher prices for the commodity.

In order for the Mozambican market to keep its competitiveness in the long-term, it's crucial to assure the processors a stable raw material source in terms of volumes and prices, as well as the ability to plan their operations.

Therefore, availability of large volumes of raw material, on the one hand will allow farmers to grow their rent and on the other, processors to pay lower prices per unit, resulting on a gain for the whole production chain.

Industry stakeholders can get further involved through the following actions:

1. Ramp-up the building of assets – trees, through increasing the volumes of the seedling distribution through governmental, non-governmental and private sector programs.
2. Implement a strong monitoring and evaluation program on seedling distribution and planting, with heavy penalties in case of non-compliance
 - This program shall be run by an independent entity
3. Bring an outside expert in cashew agronomy to evaluate the vegetative potential of the varieties that are currently being multiplied and suggest new ways forward
4. Increase the focus on post-harvest stewardship methods on the several extension services programs
5. Increase the focus of disseminating the concept investment in inputs / return on crops, through the several governmental and non-governmental interfaces with the farmers

Input distribution

Current input distribution is virtually all distributed free of charge. Incajú's program, undermines the long term farmers' ability and willingness to self-invest and ultimately become a truly commercial farmer.

Although seedlings and crop protection application are important processes on keeping the volumes and quality of the produced cashews up, the current program (MIC), disregards implementation challenges at local level, failing at creating value for the chain, in the long-term.



Despite diligent plans for distribution prepared by Incajú and other non-governmental entities, the inputs at a field level are consistently given to friends, family and others, who sometimes are not even cashew producers and use these, on their own benefit.

Although an abrupt abolition of the program would have considerable negative effects on production and processor's competitiveness, transitioning to a free-market of inputs is highly recommended. Abolition should be phased out through several seasons, under the form of discount vouchers, whereby resources are deployed in the form of discounts honored by private sector input providers.

Implementation of programs

The involvement of Northern Mozambican processors in production remains limited through the form of support to Incajú's programs, occasionally supplying means of transport and isolated cooperation on specific tasks.

Despite this reality, there is willingness from the processor's side to invest and develop field programs aiming at improving the production conditions of farmers.

Issues such as credit recuperation; traceability of farmers with "input-debt" and informal traders who tempt farmers with higher prices than those paid by processors (and no credit repayment obligations) make up a challenging environment for specific processors support specific farmers.

The idea of concessions has been discussed over time, but arguments against it, in connection to price making and consequent drop in produced volumes makes it a non-viable option.

Incajú's official, donor-funded projects, and processors field teams, can be utilized to educate producers.

A public information campaign should demonstrate that it is possible that by investing in quality chemicals, applied in the right timings and with the correct method, makes economic sense for farmers.

Labor

Labor efficiency (output) and absenteeism remains the largest operational challenge for the processors.

Over the last couple of years, several strategies have been put in place attempting to motivate the labor force towards a more efficient

Some processors have reported that the average Mozambican industrial processor could run its operations with less than 50% of its FTE, if it would not be for absenteeism.

As so, processors shall on the one hand keep reducing their labor dependency through mechanization and on the other place their activities closer to urban centers, mitigating risks related to labor unpredictability:

- Proximity to labor centers where formal work is regarded as positive setup
- Proximity to masses of more educated workers, with better working habits
- Mechanized de-shelling and other steps of the industrial transformation



Export process

In northern Mozambique, the process of exporting the kernel starting at factory gate, is a long and costly one, when compared to other countries and even other ports, within Mozambique.

In order to be liable to export kernel, processors need to fulfil steps that do not offer any value addition both to the country in terms of fiscal revenue or to the processor in increase of quality or premium charged for the kernel.

- a. TEEN – “Terminal Especial de Exportação de Nacala”, consists on a terminal (logistics park), on the entrance of the city of Nacala, that was essentially aimed at providing a shared space/park for export operators across all industries, who did not possess their own facilities and required a space to place containers while being loaded.

Despite the idea conceptually, being a good one, legislation states that all export containers must pass through TEEN, and pay a fix fee of around 7.000 mzn (\$200) regardless of the duration of stay / usage of the facilities for cargo loading or storage.

This fee relates to the physical verification from a customs official of the content of the cargo, which in the Cashew processors case, constitutes a duplication of effort, as verification happens in other parts of the process.

This step adds non-value-added costs, both through the terminal fee as well as the extra cost of the transport truck, in and out the terminal, reducing the ability of Mozambican processors exporting kernel at competitive prices.

- b. Kudumba – Consists on a large “scanner” used to electronically verify the content of the cargo of the exported containers.

For industrial processors with annual produced containers in the order of the dozens, in-factory verification of goods by customs officials constitutes a far more efficient and cheaper process of verifying the cargo.

Internal market

Official domestically consumed volumes are estimated to account for around 7% of the total produced RCN. Still, local purchased kernel is considered a luxury good due to its high price and is not available to all population since many regard it as a cash crop.

The majority of this kernel is sold at the side of the road on plastic bags and there are very few small formal roasters, flavoring and packing in plastic jars and then selling through the formal retailers.

A strong internal market is very important for a country to reduce its dependency on RCN and kernel exports. Current law requires that all packaging for internal produced goods to be in Portuguese and does not allow patches or labels – this is a law for local manufacturers that doesn't apply to importers of other appetizers, resulting on roasters taking the decision of not tapping into the local market due to the high set up costs when compared to local sales.

Therefore making the law consistent to make importers need to have Portuguese labels and not penalizing the domestic roasters of kernel is key to build a stronger internal market.