

*Relaunch of an industry:
economic impacts caused by the
redevelopment of the Mozambican
cashew processing industry*

January 2009



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Project objectives and executive summary

Industry background and current socio-economic landscape

Technoserve's role in the cashew industry

Cashew value chain

Cashew's role in the livelihoods of the rural poor

Quantitative economic impact of cashew processing industry

Initiatives to expand industry impact

The primary focus of the project is to understand the economic impacts of the Mozambican cashew processing industry

Project objectives

- Understand qualitatively how the redevelopment of the domestic cashew processing industry in Mozambique has impacted the domestic cashew industry as a whole
- Quantify the economic impact of the domestic processing industry across various stakeholder groups
- Present recommendations for maximizing economic benefits arising from the domestic processing industry moving forward

Approach

- Leverage reports and other secondary sources focused on the cashew industry
- Interview members of the Technoserve team
- Conduct field visits to cashew factories, farms, trading posts, rural communities and ports
- Conduct interviews with government officials, NGO's, trade organizations, factory managers, cashew farmers, factory workers, and residents of rural communities

Executive summary

Executive summary

- The cashew value chain involves many intermediaries between the producer and the final consumer, with a small portion of total value captured by the cashew producer and more than 80% of total value added outside of Mozambique
- Increased demand for raw nuts from the domestic processing industry has caused farm gate prices paid to cashew producers to rise
- Employment in cashew factories provides a better-paying alternative to agricultural wage labor, which is in many cases the only work available to unskilled workers in rural areas
- Wages paid to factory workers have stimulated local economies by increasing consumer buying power in rural areas
- With the rise in quantities of raw nuts processed domestically, government tax revenues have decreased due to foregone export taxes on raw nuts
- Since 2001, the aggregate positive impact of the cashew industry is \$11.5 MM, which includes a \$4.2 MM contribution in 2008 alone (does not include losses in government revenue)
- Moving forward, undertaking cashew replanting schemes, expanding producer groups, improving quality standards within factories and exploring processing of secondary products provide opportunities to expand industry impact

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Historically Mozambique was the world leader in cashew production, although the industry largely collapsed following independence

Timeline: Overview of the Cashew Industry in Mozambique

Colonial rule: 1930's – 1974

- Mozambique is a world leader in production of raw cashew nuts
- Production maintained by implementation of government programs aimed at small farmer output
- Mozambique establishes first industrial cashew processing plant in Africa in 1960
- High quality of kernels achieved due to focused replanting efforts, which largely cease by 1965

Independence and civil war: 1974 – 1992

- Instability and destruction of infrastructure stymies production and sales of raw nuts
- Ban on exports of raw nuts imposed in 1978 imposed to encourage domestic processing plants
- Large scale industrial processing plants operate primarily in urban areas
- Planting of new trees reduced to negligible levels

Rebuilding and subsequent collapse: 1992 – 2001

- Utilization of large factories with high degrees of mechanization
- Export ban on raw nuts removed and a tax on exports imposed
- In 1995, the World Bank recommends that the export tax on raw nuts be phased out
- The domestic processing industry collapses in 2001, in part due to market liberalization

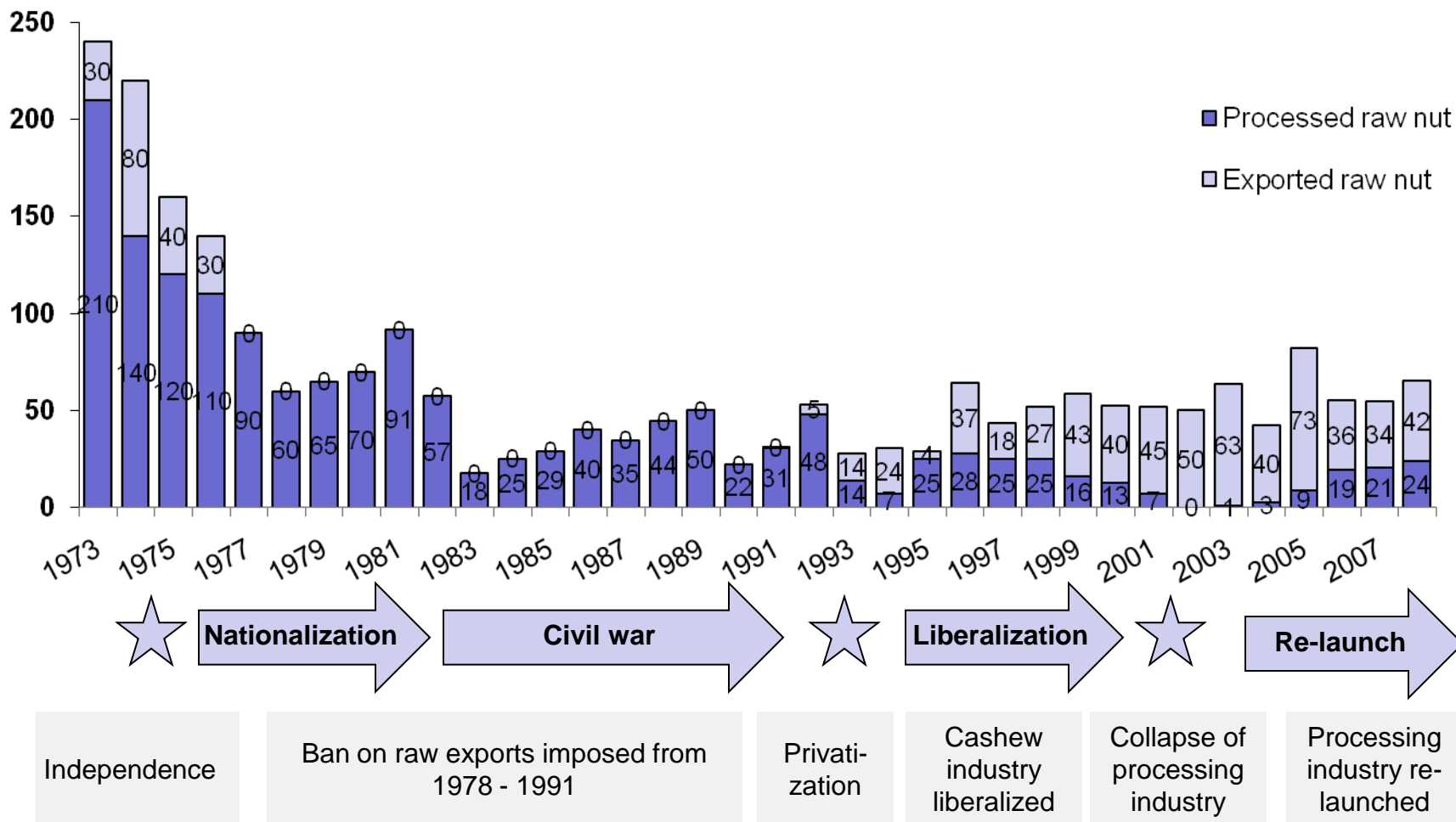
Revised outlook: 2001 – present

- With the goal of opening new factories, Technoserve assists investors in business plan development, accessing capital and provides technical support
- Smaller scale, semi-mechanized factories operate in rural areas
- Considerable investment attracted and profitability achieved across a number of factories

The evolution of cashew production and processing is closely linked with major political and economic events

Mozambican raw nut exports and processed nut quantities

Tons, (000s)



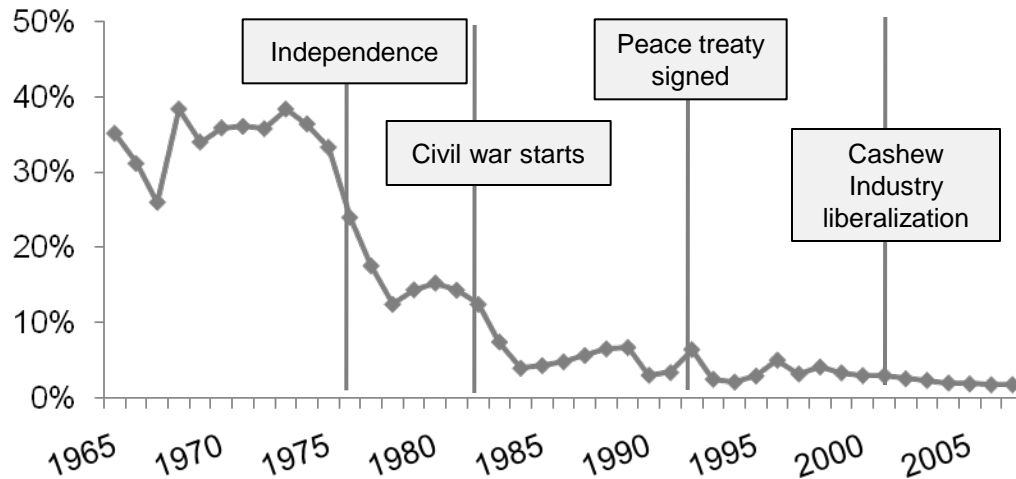
* Significant differences in datasets examined exist although there is agreement on overall trends

Source: INCAJU statistics; FAO stat; author's calculations (see appendix) McMillan, 'When Economic Reform Goes Wrong: Cashews in Mozambique', Harvard University (2002)

Historically, Mozambique comprised a notable portion of the world share of both raw nut production and processed kernel exports

Mozambican's share of world raw nut production

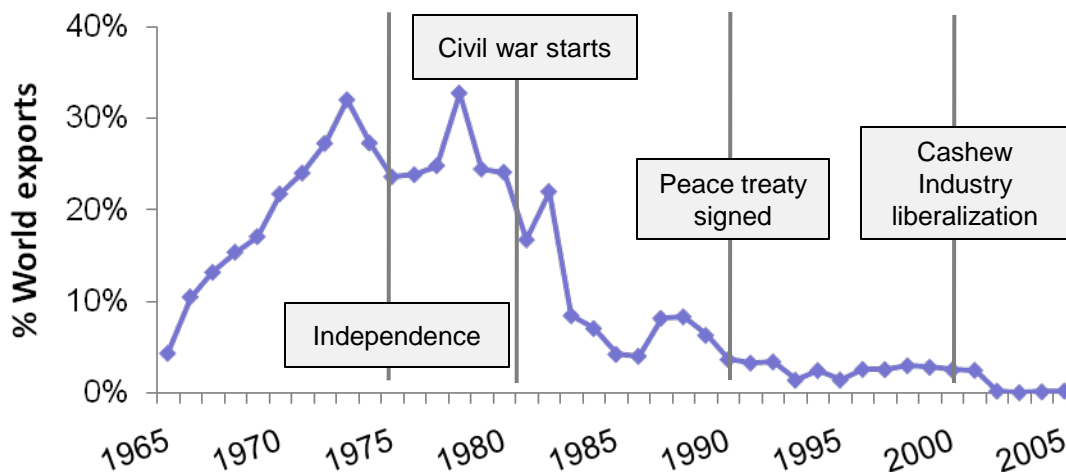
Percentage



- Mozambique is the world leader in raw cashew nut production from 1965 – 1975
- Following 1973, cashew production drops by more than 50% over the following five years
- After the civil war, production increases modestly but fails to show clear upward trends

Mozambican's share of world processed kernel exports

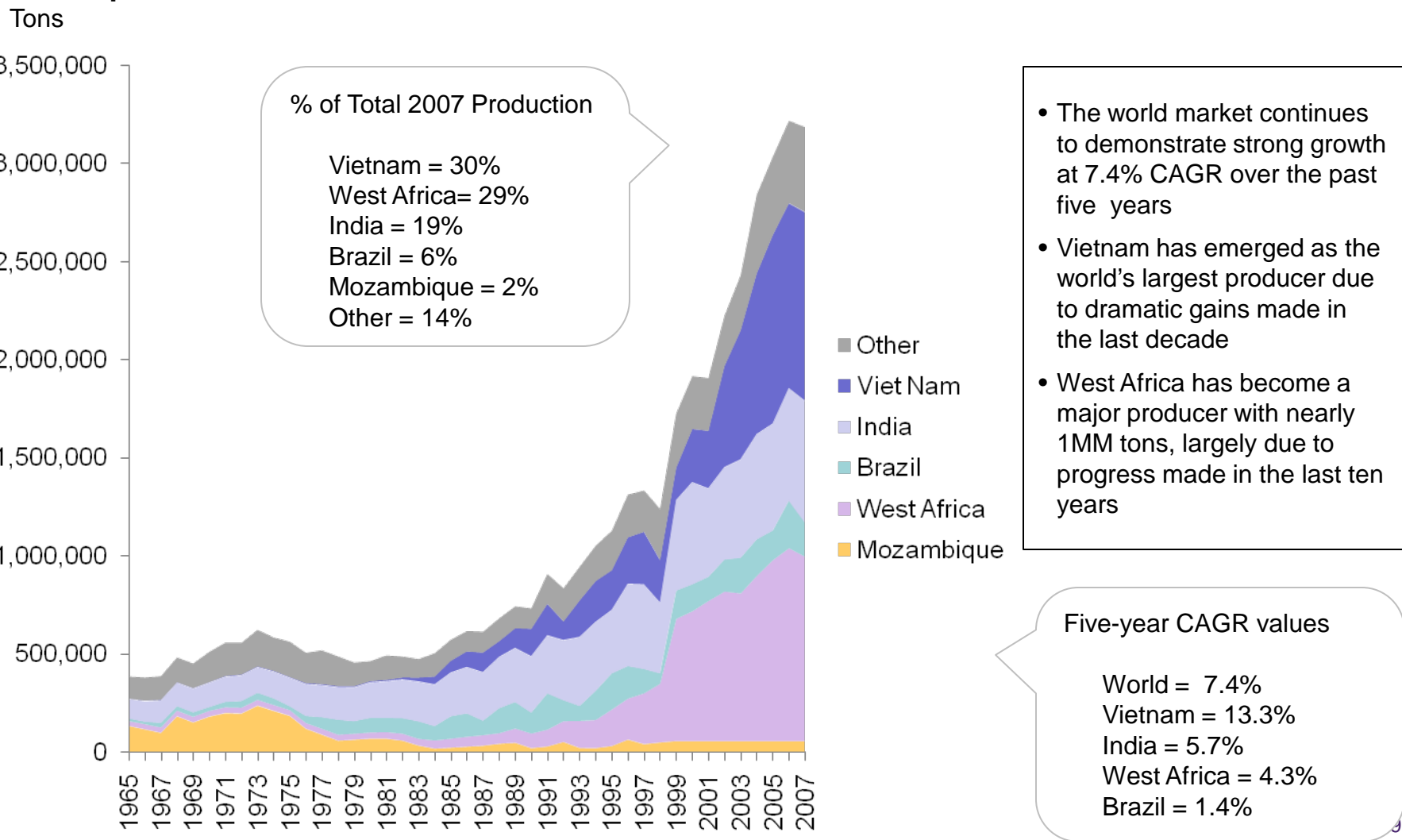
Percentage



- Despite the drop in production of raw nuts, the domestic processing industry continues to produce roughly one third of the world's exports due to a ban on exports of raw nuts imposed in 1978
- Following the end of the civil war, Mozambique's share of world exports remains minimal

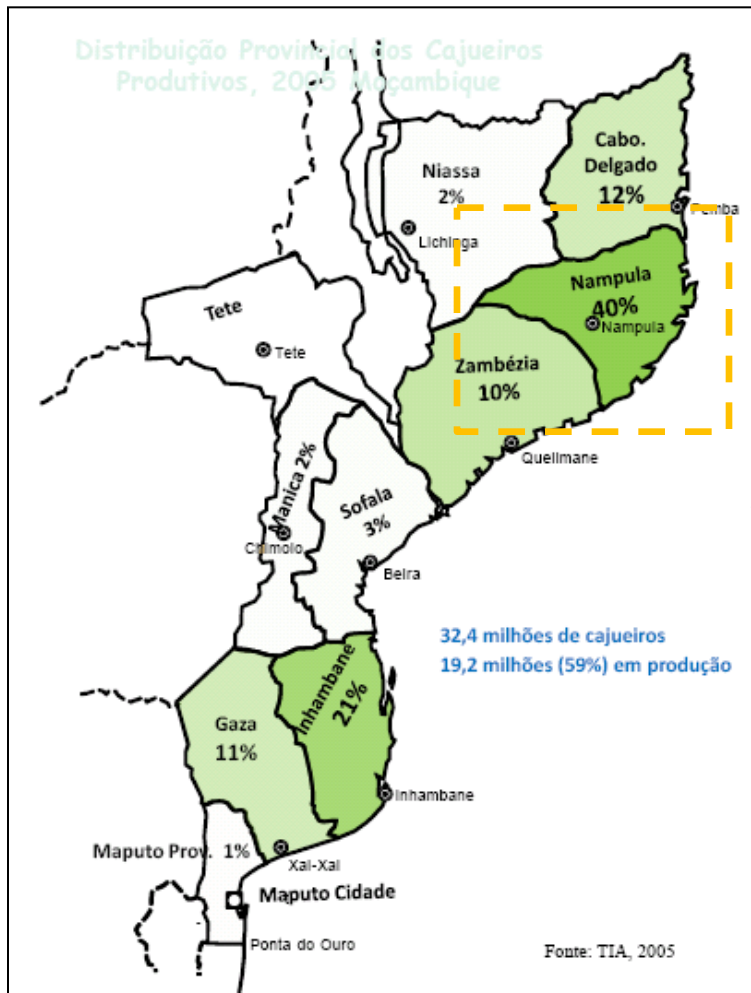
In contrast to the stagnation in Mozambican production, the world market has expanded dramatically over the past few decades

Global production of raw cashew nuts



Cashew production currently involves approximately one million small producers, yet productivity and replanting rates are quite low

Raw nut production



Majority of cashew factories located in Nampula

Estimates of Nampula's share of national nut production reach as high as 60%*

- The vast majority of raw production is produced by small farmers typically owning around 20 trees
- 42% of farmers in Mozambique own cashew trees, which represents approximately one million producers
- In 2005, there were roughly 19 million cashew trees actively producing fruit out of a total of 32 million total trees
- Average per tree productivity is very low at around 2 – 4 kg of raw nuts, which is well below attainable levels of 8-10 kg per tree
- Although a good deal of uncertainty exists, roughly 10%-35% of cashew production is retained and consumed within households
- In 2005, only 5% of farmers owning cashew trees reported having planted new trees in the past 12 months

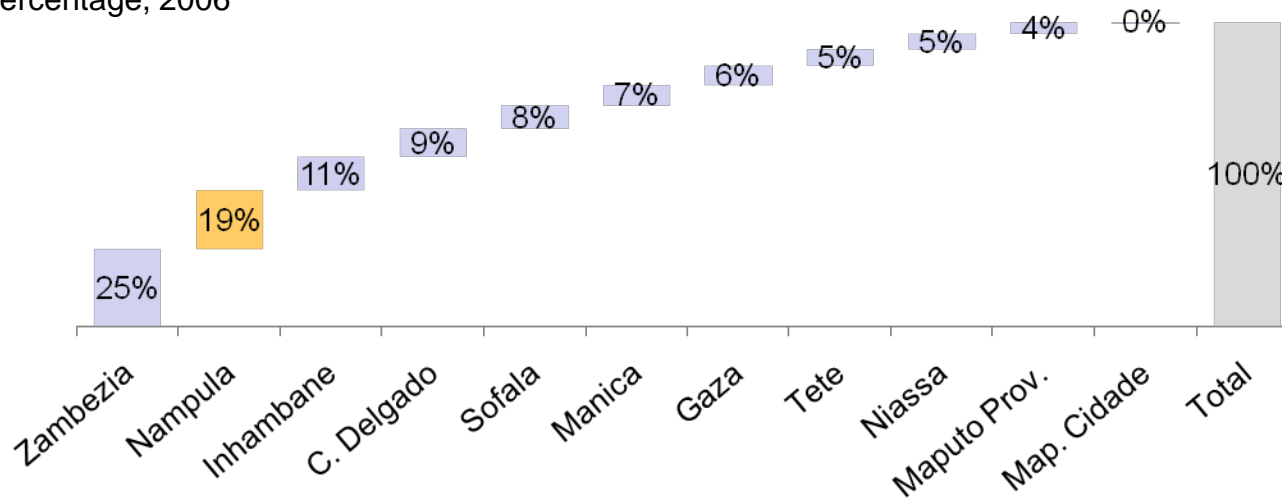
*Source: Artur and Kanji, "SATELLITES AND SUBSIDIES: LEARNING FROM EXPERIENCE IN CASHEW PROCESSING IN NORTHERN MOZAMBIQUE", Nov 2005.

Other Sources: MINAG TIA 2005; FJC, GAPI-SI, "Iniciativa Mais Caju Moçambique: Desafio e Visão", (May 2008); McMillan, "When Economic Reform Goes Wrong: Cashews in Mozambique", Harvard University (2002)

Nampula is the second largest provincial agricultural producer and has demonstrated healthy growth rates in most recent years

Provincial share of agricultural production

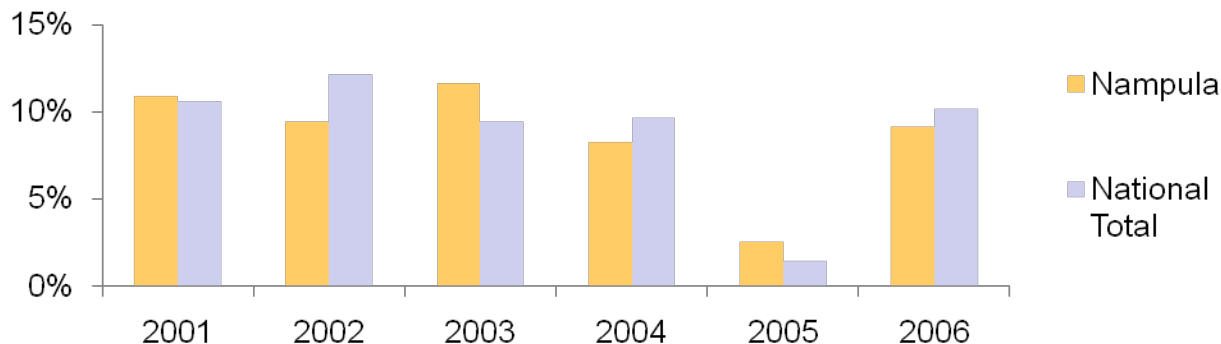
Percentage, 2006



- Nampula accounts for a substantial portion of total agricultural production at nearly one-fifth of the total
- Growth rates of agricultural production in Nampula have been strong in recent years at more than 8% per year

Agricultural production growth rates

Percentage (real terms), 2006



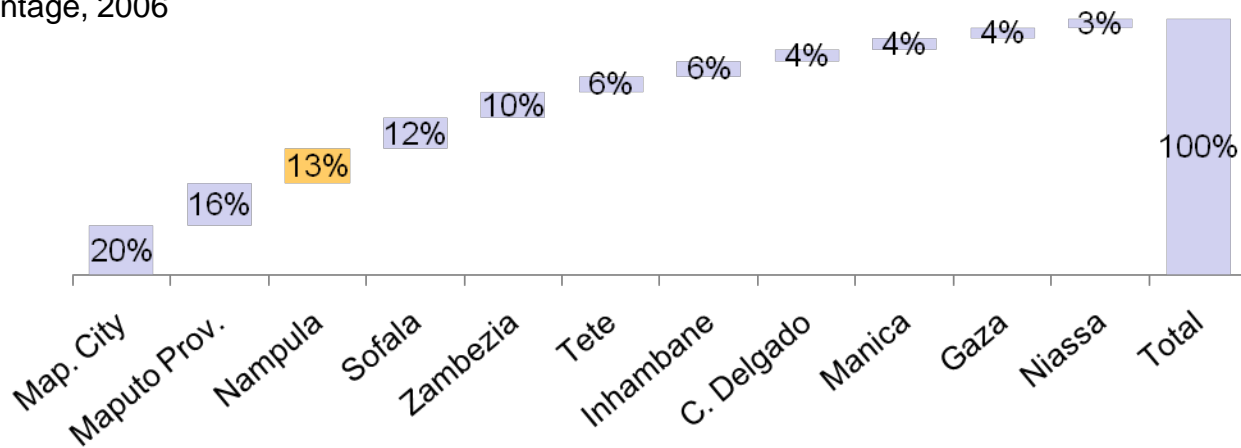
Compound Annual Growth Rate ('00 – '06)

Nampula= 8.6%
Nation= 8.9%

Although Nampula's share of total national economic production is fairly high, per person GDP is relatively low

Provincial GDP

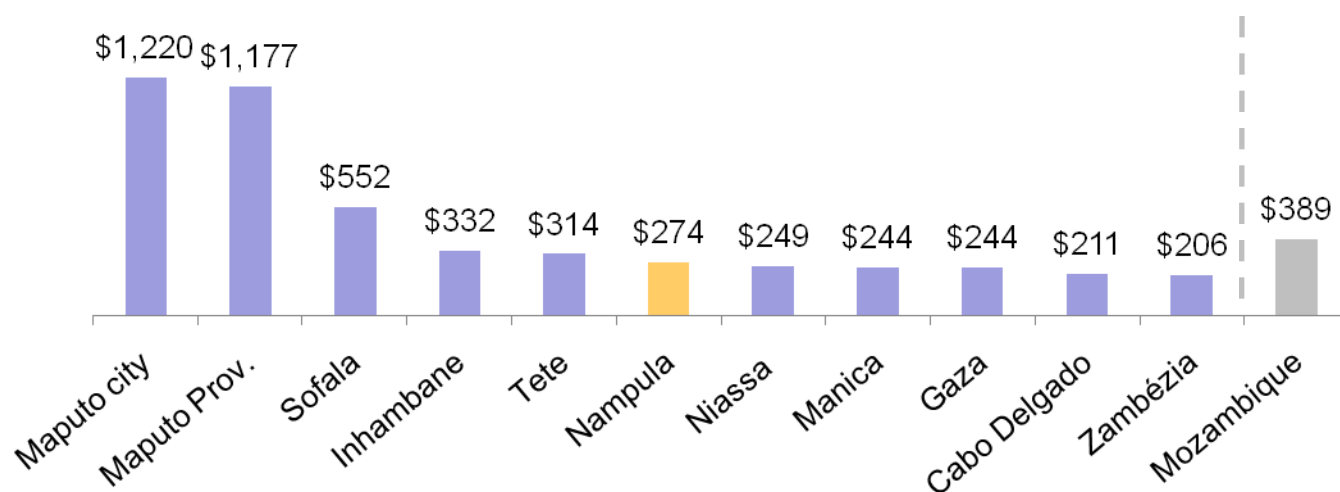
Percentage, 2006



Total GDP was 193 Billion Meticais in 2006

Per capita GDP

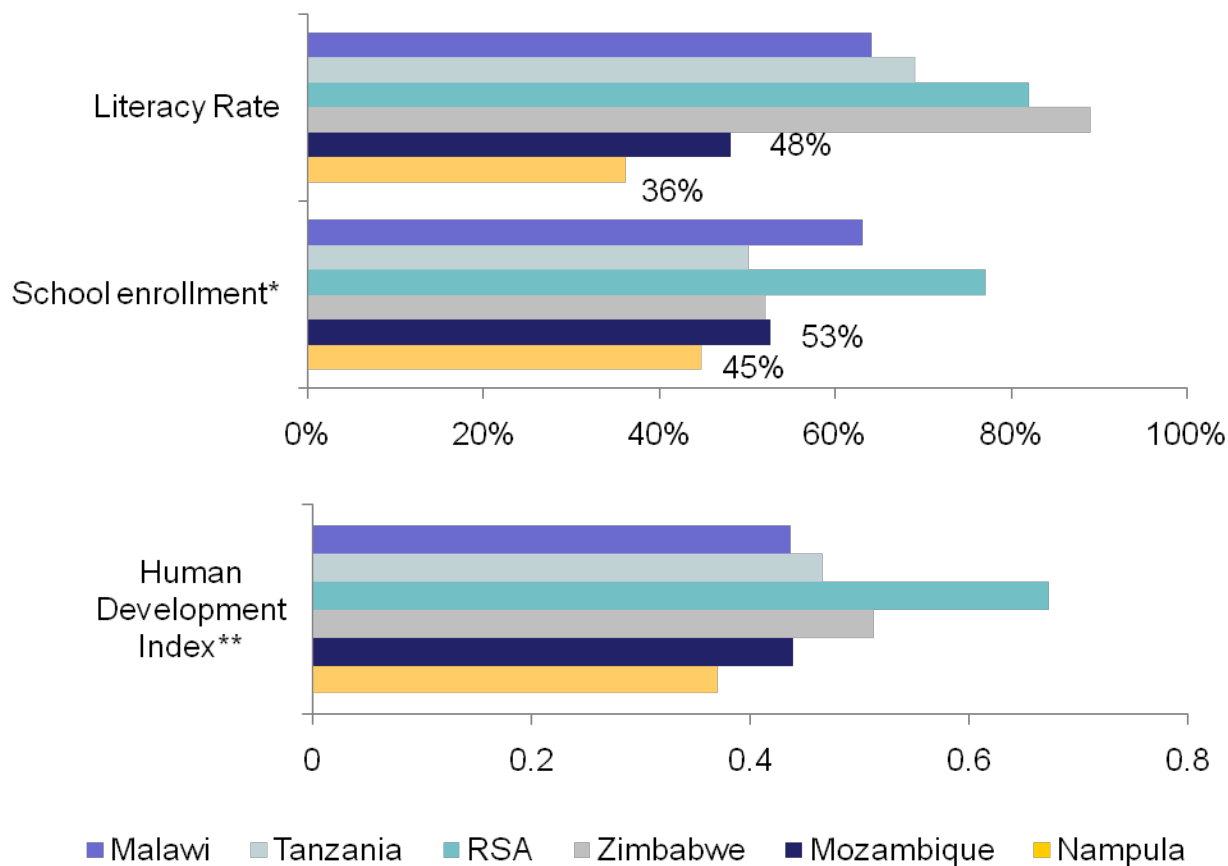
USD, 2006



- Behind Maputo city and province, Nampula is the largest producing province in terms of overall economic output
- However, GDP per capita is quite low in Nampula at under \$300 per person

In addition to low per capita income, levels of development in the Nampula province are also below regional standards

Levels of development, 2006



- Literacy rates in Mozambique are the lowest in the region at 48%
- Within Nampula itself, literacy rates fall even further to just over one-third of the population
- Due to low school enrollment rates, prospects in the near future to improve literacy rates appear bleak
- Low overall development levels in Nampula inhibit efforts to raise education levels

*Note: includes primary, secondary and tertiary enrollment rates

** Note: The Human Development Index measures three basic dimensions of human development: health, education and living standards

Source: UNDP, INE (for Nampula data)

Note: HDI values for Tanzania, RSA, Malawi and Zimbabwe from 2005, Literacy rates and Combined school enrollment rates for Malawi from 2005

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Technoserve has played an integral role in the revitalization of the cashew industry since initially becoming involved in 1998

Technoserve activities in the Mozambican cashew processing industry

	Concept		Startup			Infant		Self-sustaining growth		
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Major strategy reviews	Cashew subsector analysis		Cashew processing strategy			Cashew subsector analysis			Labor study	
Legacy processor assistance (large scale)	Aconcaju and CCM factories									
Processor start up assistance		Entrepreneur assistance (failed)	Entrepreneur assistance (successful)							
Government lobbying			Working capital guarantee fund		Minimum wage laws reviewed					
Institutional support			INCAJU strategy (govt cashew promotion agency)			AIA creation / Restructuring and redirection of AICAJU				

As the industry's needs have evolved, Technoserve's role in supporting the industry has also progressed

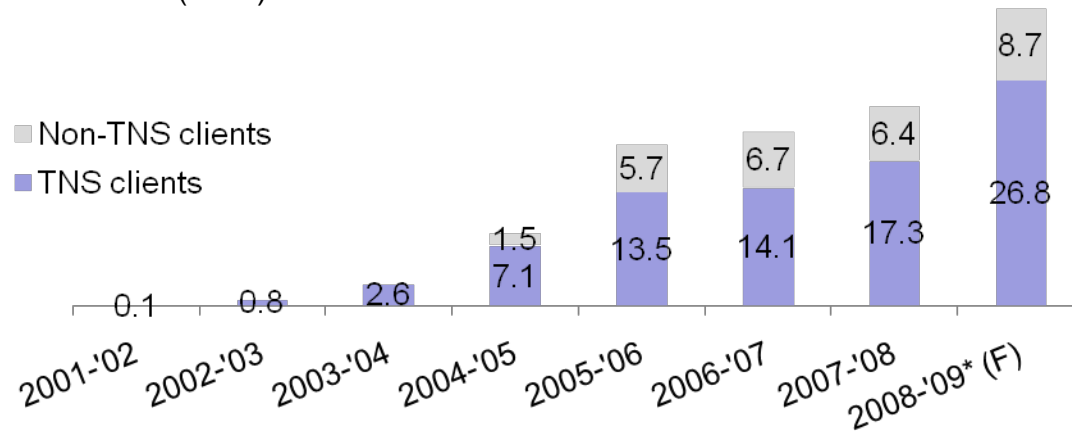
Technoserve model for new industry assistance

Industry Stage	Concept		Startup		Infant		Self-sustaining growth	
Operating businesses (# total)	None		1-3		3-12		16+	
Technoserve priorities	<ul style="list-style-type: none"> Develop business plans Identify entrepreneurs 		<ul style="list-style-type: none"> Assist in day to day operations (management and technical) Facilitate access to capital 		<ul style="list-style-type: none"> Strengthen industry level bodies Assist in day to day operations 		<ul style="list-style-type: none"> Coach entrepreneurs Facilitate access to resources (including financial) 	
Other Technoserve activities	<ul style="list-style-type: none"> Build linkages to suppliers and customers 		<ul style="list-style-type: none"> Identify new entrepreneurs Develop business plans 		<ul style="list-style-type: none"> Identify new entrepreneurs Develop business plans Facilitate access to capital 		<ul style="list-style-type: none"> Conduct ongoing studies to further develop strategies and practices 	
Technoserve resources								

Thanks in part to Technoserve's assistance, the processing industry is competitive and exhibiting steady growth

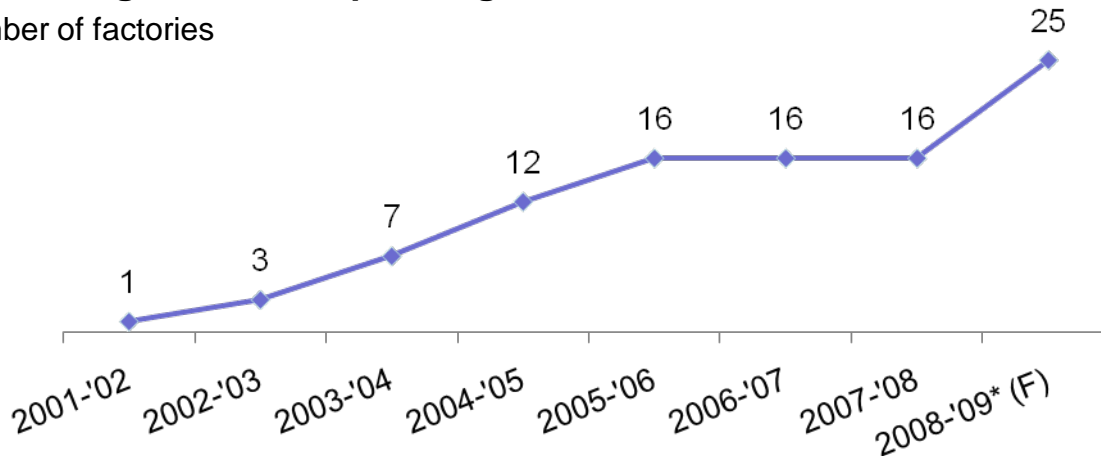
Domestic Cashew Processing

Tons of raw nuts (000s)



Processing Factories Operating

Number of factories



*Note: 2008-'09 figures are forecasted values.

**Note: Number of processing factories operating includes both Technoserve clients as well as non-Technoserve clients

Source: Technoserve data

- Once Technoserve clients proved the viability of the industry, other investors entered the industry
- Technoserve assisted clients continue to account for the majority of domestic processing

No new factories opened from 2005 – 2007 due to:

- Uncertainty surrounding minimum wage legislation
- Relatively low margin between prices for raw nuts and prices for processed kernels

Resolution of minimum wage legislation and improved margins has encouraged notable growth in 2008-'09

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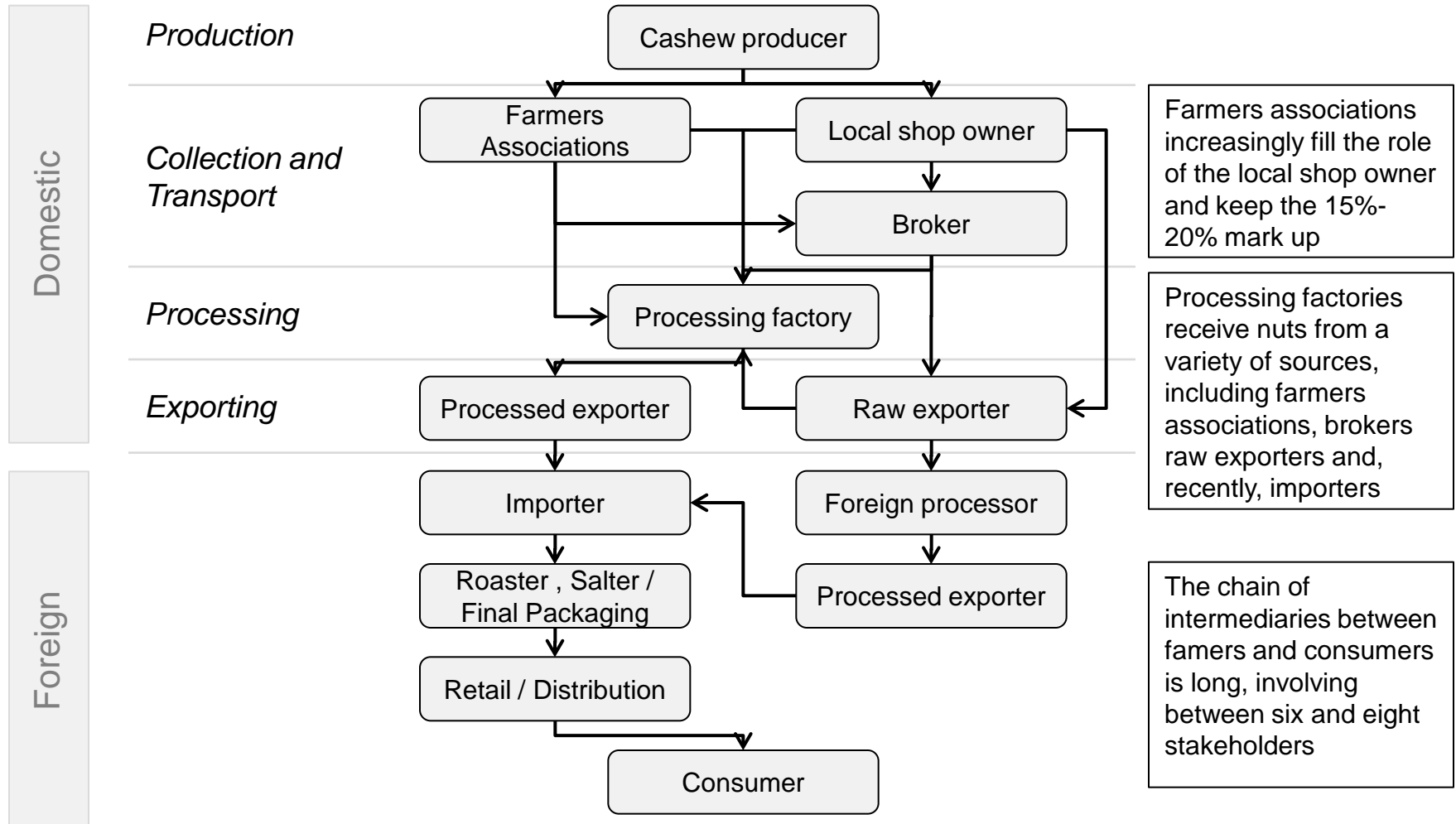
Cashew's role in the livelihoods of the rural poor

Quantitative economic impact of cashew processing industry

Initiatives to expand industry impact

The cashew value chain is complex, comprised of many links across a long chain of domestic and foreign intermediaries

Cashew Industry Value Chain



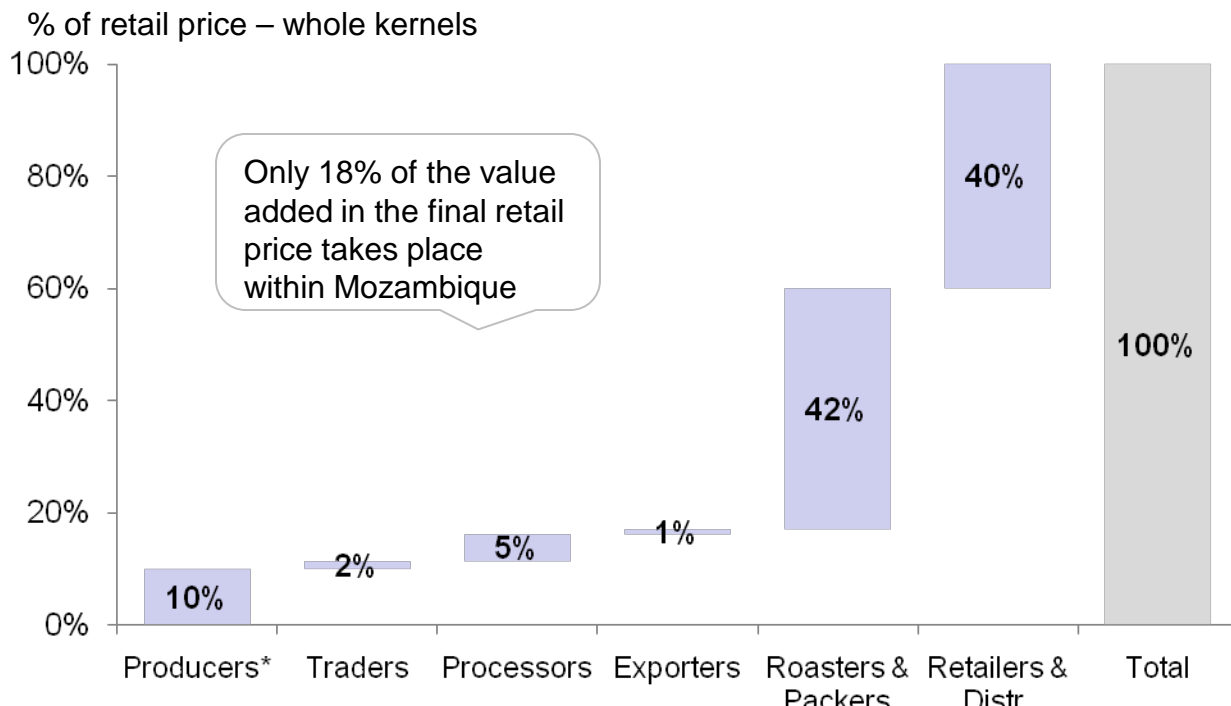
Note: Process shown above refers to whole kernels, or broken grades that are directly marketable to consumers. Broken nut grades that are not marketable directly to consumers are added as ingredients in other consumer food products.

Source: Technoserve interviews; 'Labor Costs within Mozambique's Cashew Processing Factories: Statutory Minimums and Requirements for Competitiveness', Technoserve, (Dec 2006); FJC e GAPI-SI, "Iniciativa Mais Caju Mocambique: Desafio e Visao", (May 2008)

Although production and processing takes place domestically, the majority of value in the value chain is added abroad

Cashew Value Chain, 2007/08

Value added at each stage of the value chain



- Producers receive a small portion of total value added at only 10% of the final retail price
- Processors capture slightly more than a quarter of total value added domestically
- The vast majority of value added takes place in the final roasting, packaging and distribution steps

	Producers*	Traders	Processors	Exporters	Roasters & Packers	Retailers & Distr	Total
Selling Price (per kg)	\$2.48	\$2.86	\$4.05	\$4.28	\$15.00	\$25.00	
Value Added (per kg)	\$2.48	\$0.38	\$1.19	\$0.23	\$10.72	\$10.00	\$25.00



*Note: Producer prices shown represent kernel prices, which are assumed to be 20% of the weight of raw nuts.

*Note: Farm gate price data assumes a price of \$450 per ton. If the INCAJU farm gate price data of \$316 per ton is used, producers' share drops to 7%.

Source: Technoserve data on farm gate and factory gate prices; AIA export data; author's observations of retail and wholesale prices (Nov '08)

Various industry and government organizations are active in the cashew industry, each of which provides varied and complimentary services

Industry level bodies and scope in Mozambican cashews

INCAJU

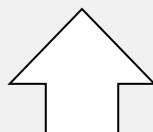
- National Government body responsible for setting policies affecting the cashew industry and export tax collection
- Carries out extension services by providing seedlings and pesticides to cashew farmers
- Provides loan guarantees to processors to purchase capital equipment and raw nuts

AICAJU

- Industry association created to promote interests of industry stakeholders
- Responsible for devising and implementing consistent policies and practices across members
- Currently only processors are members, but open to all groups involved in cashew industry

AIA

- Private service company focusing on exporting and marketing of processed kernels
- Created to decrease export costs by creating economies of scale among domestic processors
- Owner of the Zambique™ brand
- Joint ownership by four processing companies
- AIA services also provided to three additional processors

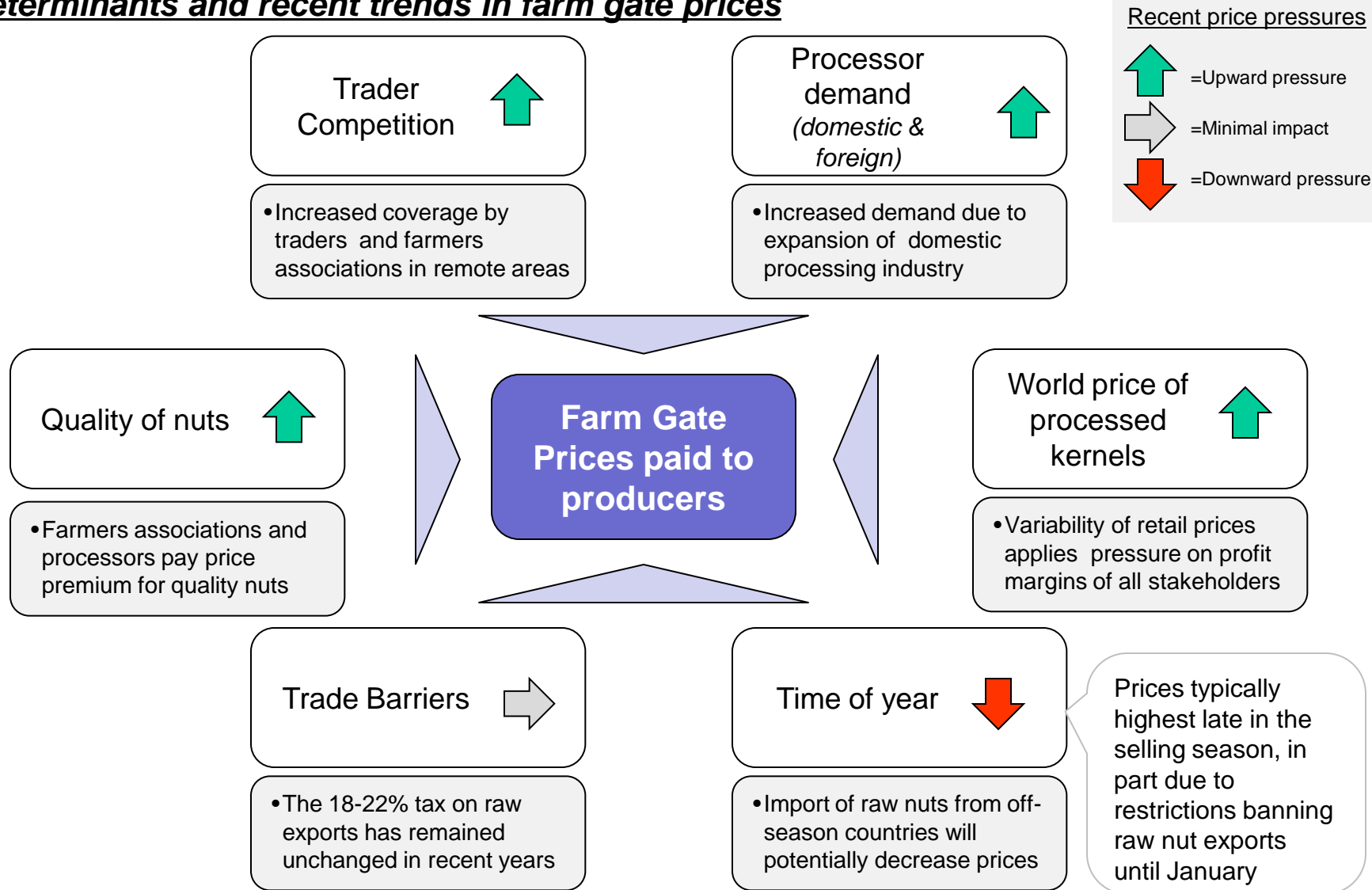


- **Many local and regional cashew traders**
- **~10 exporters of raw nuts**

- **Approximately one million small farmers producing cashews**

Farm gate prices are influenced by a variety of factors, many of which have recently applied upward price pressure

Determinants and recent trends in farm gate prices

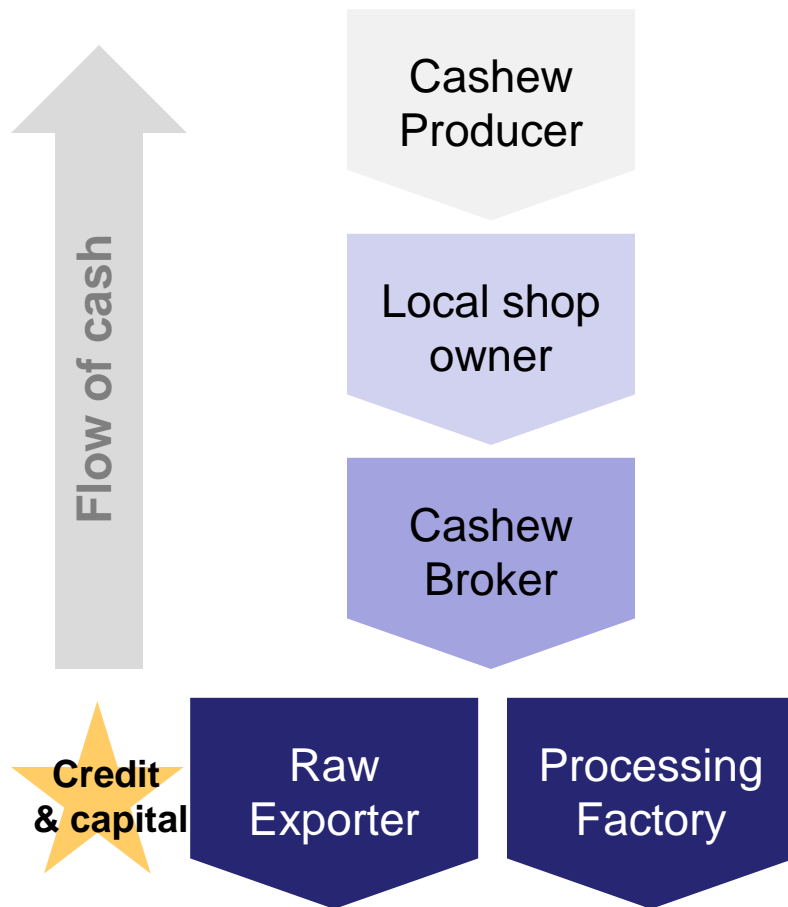


Source: Technoserve interviews

** Refers to countries in the northern hemisphere, such as west African countries that have alternate buying seasons due to northern hemisphere location

The majority of cashew nuts are purchased through local traders and cashew brokers

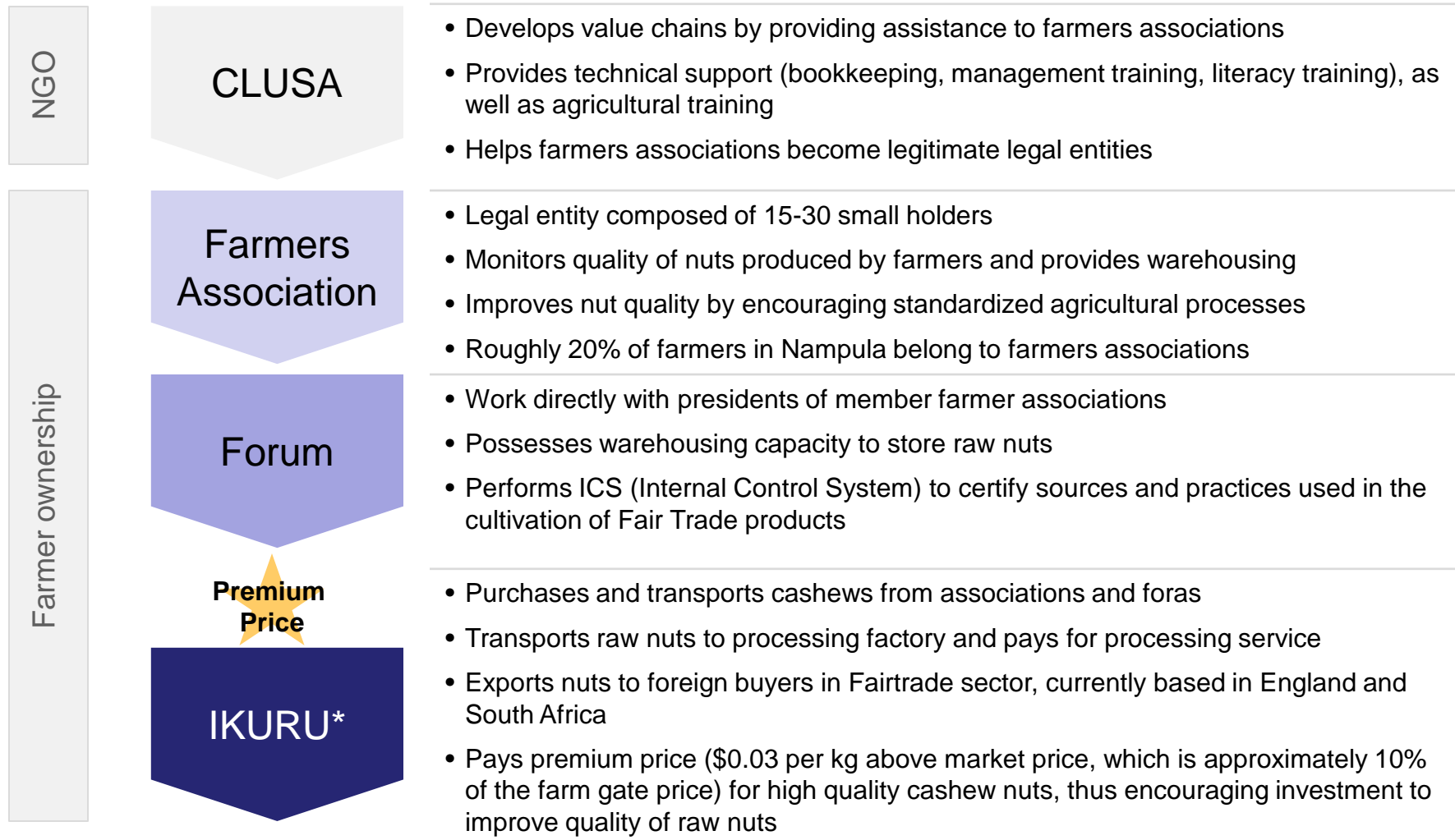
Trade through local traders and brokers



- The vast majority of cashew production is generated by small farmers, which typically produce between 50 - 400 kg of raw nuts annually (25 -100 cashew trees)
- Collects raw nuts, separates nuts from fruit and takes dried nuts to local collecting posts
- Based in rural areas and typically purchase raw nuts from around 5-8 local collecting posts
- Sell to both brokers and cashew processing factories
- Receive cash in advance from brokers or cashew factories to buy raw nuts
- Located in towns or key trading junctions
- Large barriers to entry due to large capital requirements
- Typically possess warehousing capabilities and have long standing relationships with both producers and raw exporters
- ~10 raw exporters based in the Nacala and Maputo ports
- Exporters possess a strong buying position relative to factories due to strong existing relationships with brokers and traders
- Factories concerned with quality of nuts due to impact on profits, whereas exporters not directly affected by quality

The emergence of farmers associations is aimed to shorten the value chain and raise farm gate prices paid to cashew producers

Trade through Farmers Associations

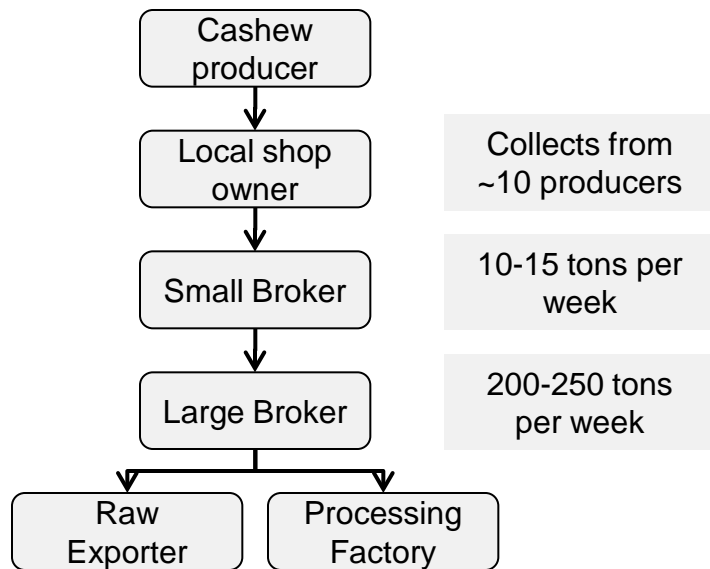


*Note: IKURU ownership includes foras (20%), GAPI (40%) and NIVIBL (40%)

Source: Technoserve interviews; Equal Exchange UK website; interview with Martin Mason of CLUSA (Oct '08); Interview with Moises Raposo of IKURU (Oct '08)

Increased competition for raw nuts has shaped a more dynamic procurement model, resulting in higher prices to farmers

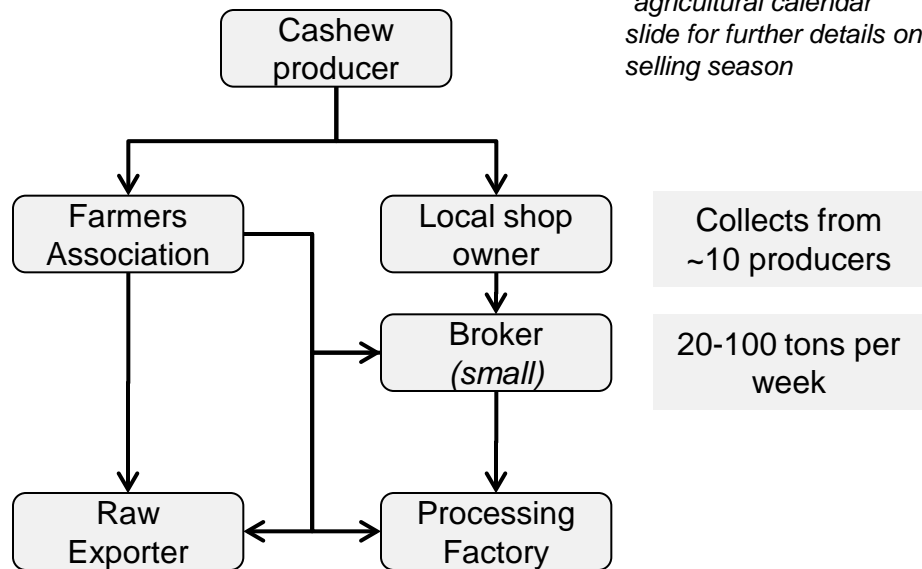
Traditional purchasing model



- The chain of intermediaries was traditionally very long, resulting in decreased share for farmers
- Few choices of buyers for remote producers, resulting in price differences across geographies
- Exporters and processing factories primarily dealt with large traders

“I used to only work with brokers who could provide at least 250 tons per week... With three brokers, I could obtain raw nuts for the entire season.” –*Shakti Pal*

Current purchasing model



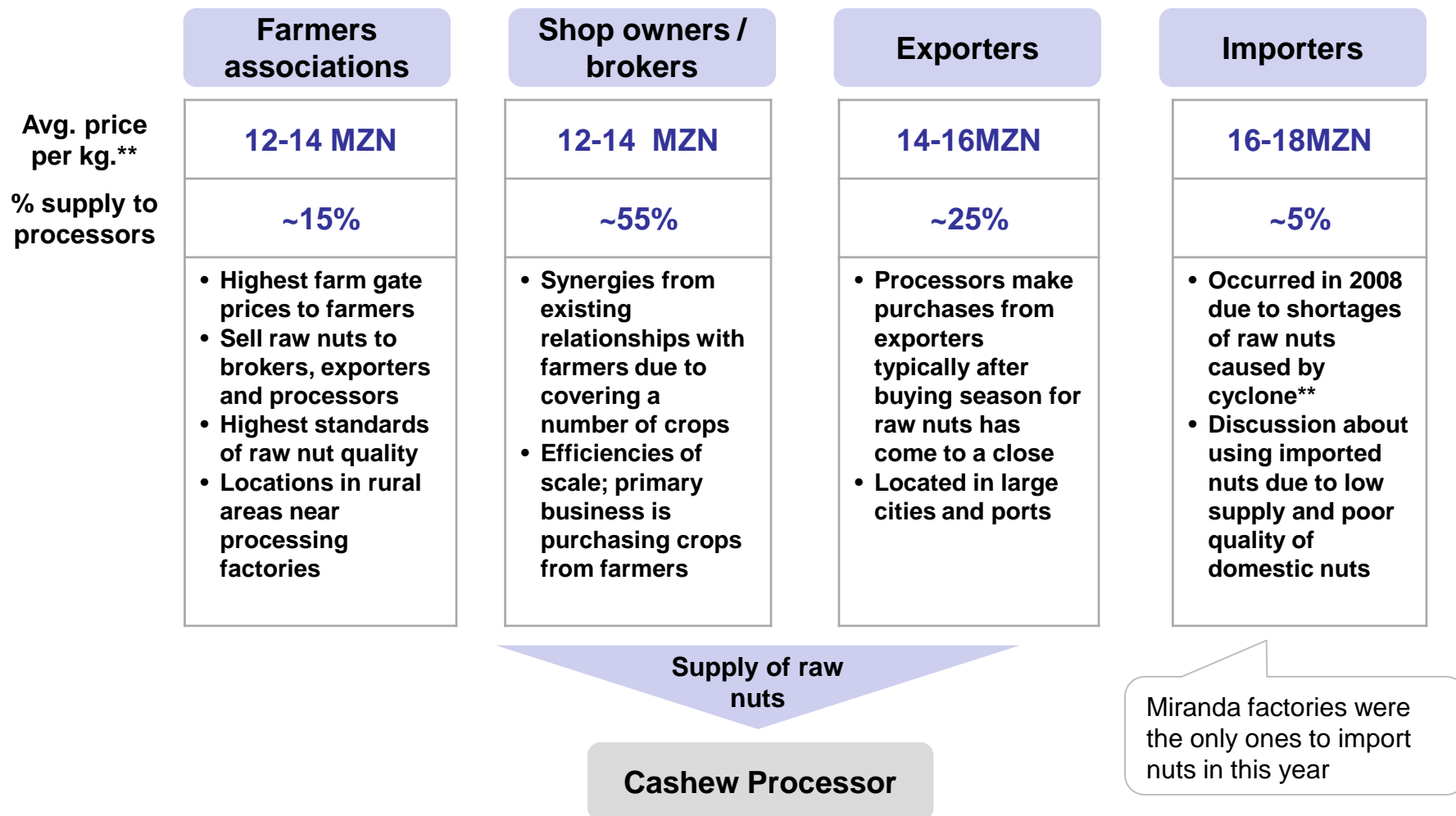
Note: See following “agricultural calendar” slide for further details on selling season

- Exporters and processing factories have been pushed to travel further into rural areas to obtain raw nuts, thus causing the large broker to drop out of the supply chain
- Higher prices paid to farmers due to less intermediaries and slimmer margins for brokers and traders
- Little difference in prices paid to producers based on geographical location

“Buyers now need to spend a lot of time and effort to obtain raw nuts... Once you give a shop owner money for nuts, you need return every couple of days to collect them. If you don’t, the trader will sell to someone else for a better price and return your money.” – *cashew buyer*

Cashew factories purchase raw nuts from a variety of sources, which vary noticeably in terms of price

Source of raw cashew nuts for processing plants, 2007/08



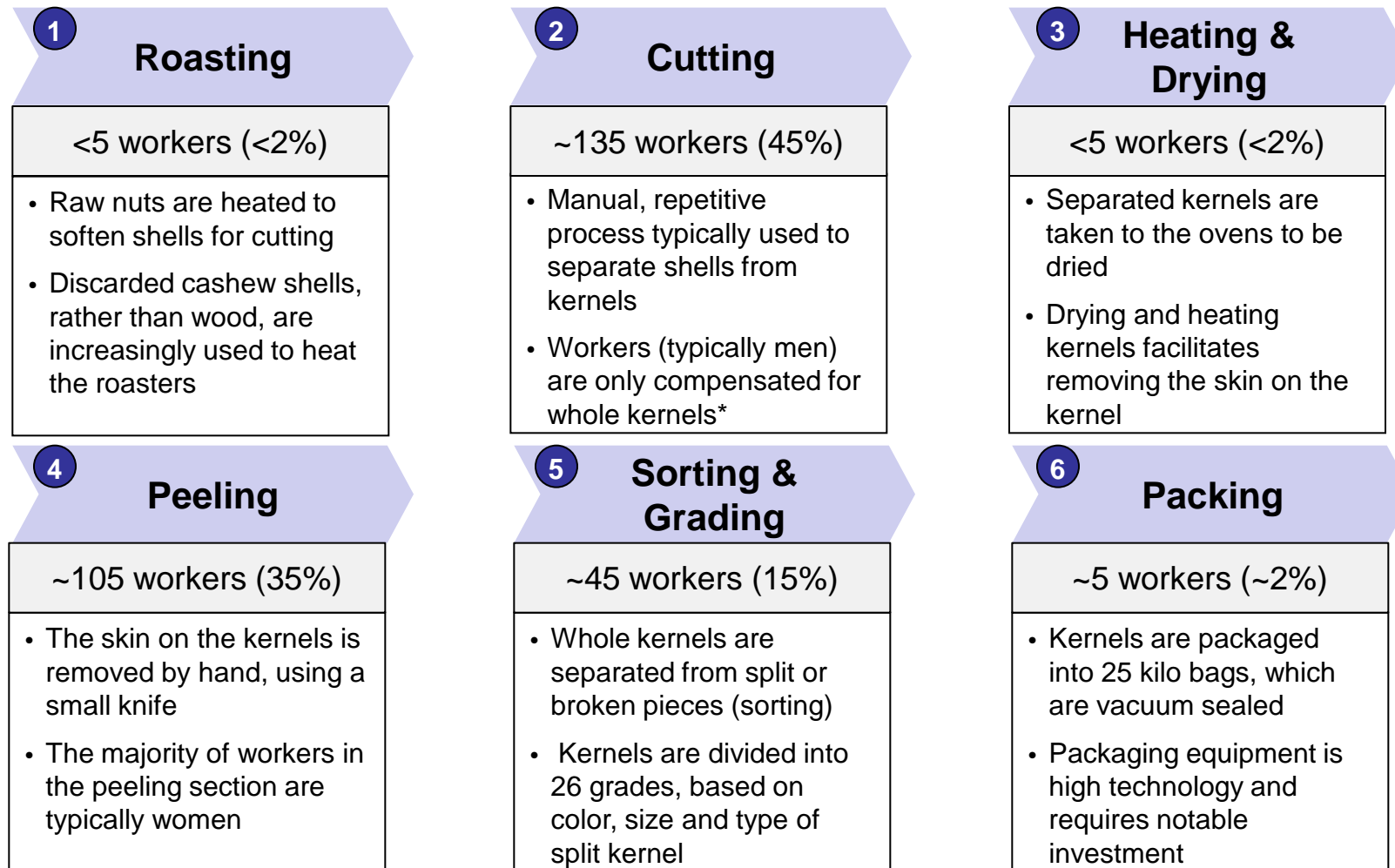
Note: The exchange rate from Meticais to Dollars in 2008 was approximately 25 to 1.

**Experiences with imported raw nuts from Ghana have been unfavorable due to lower-than-expected quality of nuts (Miranda factory in Namige)

Source: Technoserve interviews and interviews conducted with manager at Miranda Nametil processing factory (Oct 2008)

Processing of raw nuts is composed of six primary steps, of which cutting and peeling are the most labor intensive

Inside the factories: manual processing steps (workers for every 1,000 tons processed)



****Assumes 300 total workers for every 1,000 tons of raw nuts processed**

*Note: Typical breakage rates for kernels are around 83% to 87%.

Workers figures source: Author's interviews with managers at Miranda Namige factory and Condorcaju Nametil factory (Oct, 2008),

Other sources: author's observations; Brad Paul, "Factories in the Field: Rural Transformation and the Organization of Work in Mozambique's Cashew Triangle", (July 2008)

AIA has streamlined export procedures, which has resulted in substantial costs savings for processors

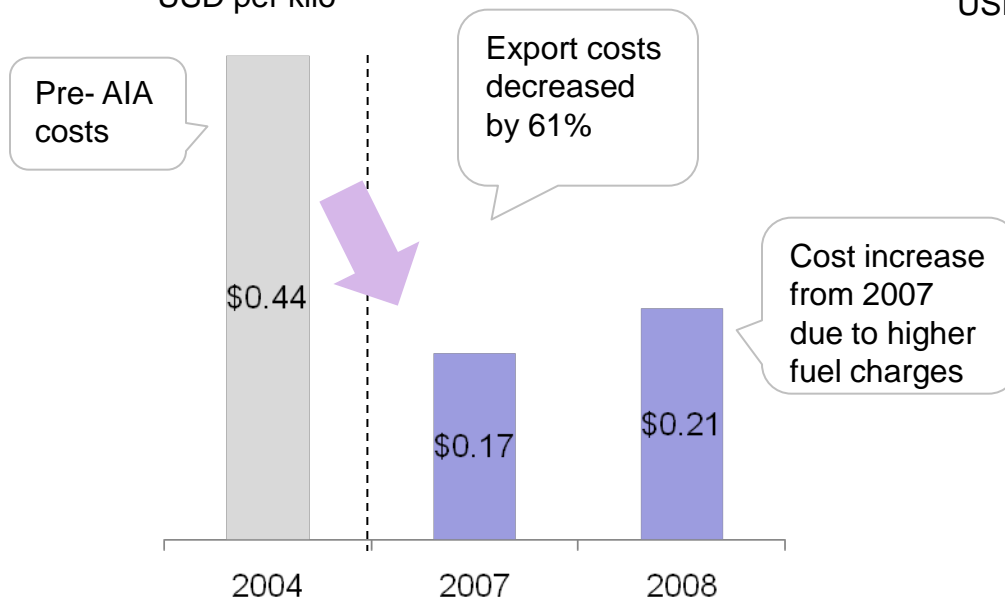
Export of processed kernels – AIA's role

Roles and services of AIA

- Provide scale in purchasing imports for factory production, which primarily includes consumables but may also include non-durable machinery
- Manage price negotiations with customers (~70% future contracts, ~30% spot sales)
- Complete paperwork for exporting processed nuts; handle export logistics
- Remit sales, net of costs, to member processors
- Promote and manage Zambique™ brand

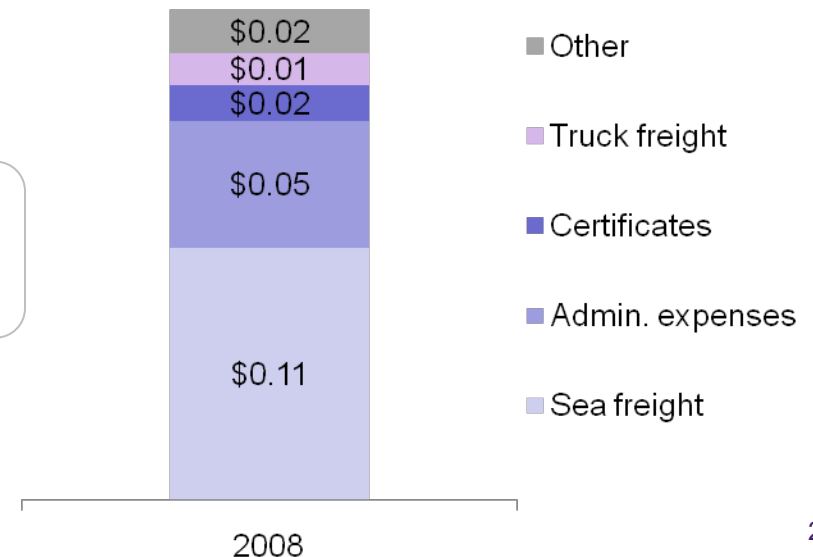
Export Costs

USD per kilo



Detail of export costs

USD per kilo



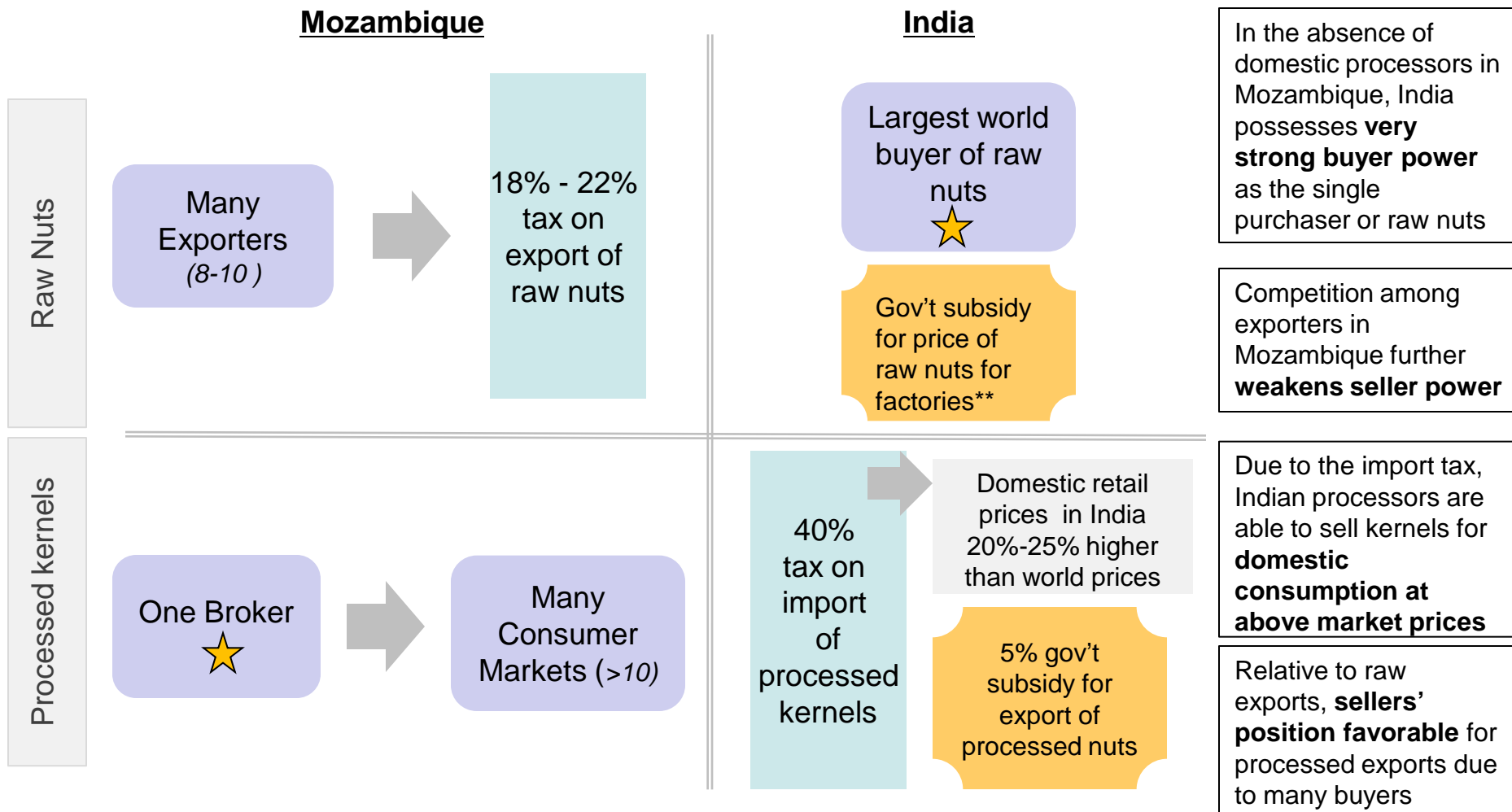
Once processed kernels leave Mozambique, it takes roughly two months to reach the final consumer

Transport from Mozambique to retail

	Description	Location	Timing
Export	<ul style="list-style-type: none"> • 23 kg bags of processed kernels leave Nacala port by ship • Shipping route goes to India first, before continuing on to Rotterdam 	<p>Nacala, Mozambique</p> <p>Mumbai, India</p>	31-33 days
Customs	<ul style="list-style-type: none"> • Containers warehoused while customs procedures take place 	Rotterdam port, Holland	~ 7 days
Warehousing	<ul style="list-style-type: none"> • Once through customs, boxes of kernels taken by truck to private warehousing facility • Upon receiving an order, kernels are transported to cooking and packing unit 	~10km from Rotterdam port	Variable
Cooking and packaging	<ul style="list-style-type: none"> • Flavoring added to kernels in some cases • Kernels placed in plastic containers, thus no longer carrying Zambique branding 	~10km from Rotterdam port	< 7 days
Distribution	<ul style="list-style-type: none"> • Kernels are distributed to network of retail stores by truck 	Across Europe	1-2 days
Retail	<ul style="list-style-type: none"> • Kernels are removed from plastic containers and arranged within retail setting 	Across Europe	1-2 days

The international market for both raw and processed cashews exhibits distortions, which shape trade dynamics

Market dynamics of cashew trade



**The government has a monopoly and procurement of raw nuts in the Kerala province (>50% of national cashew production) and is reputed to make a loss due to high prices paid to farmers and low prices of raw nuts sold to factories, thus subsidizing both farmers and processors (McMillan)

Source: Interview with Shakti Paul (Dec 2008); McMillan, 'When Economic Reform Goes Wrong: Cashews in Mozambique', Harvard University (2002)

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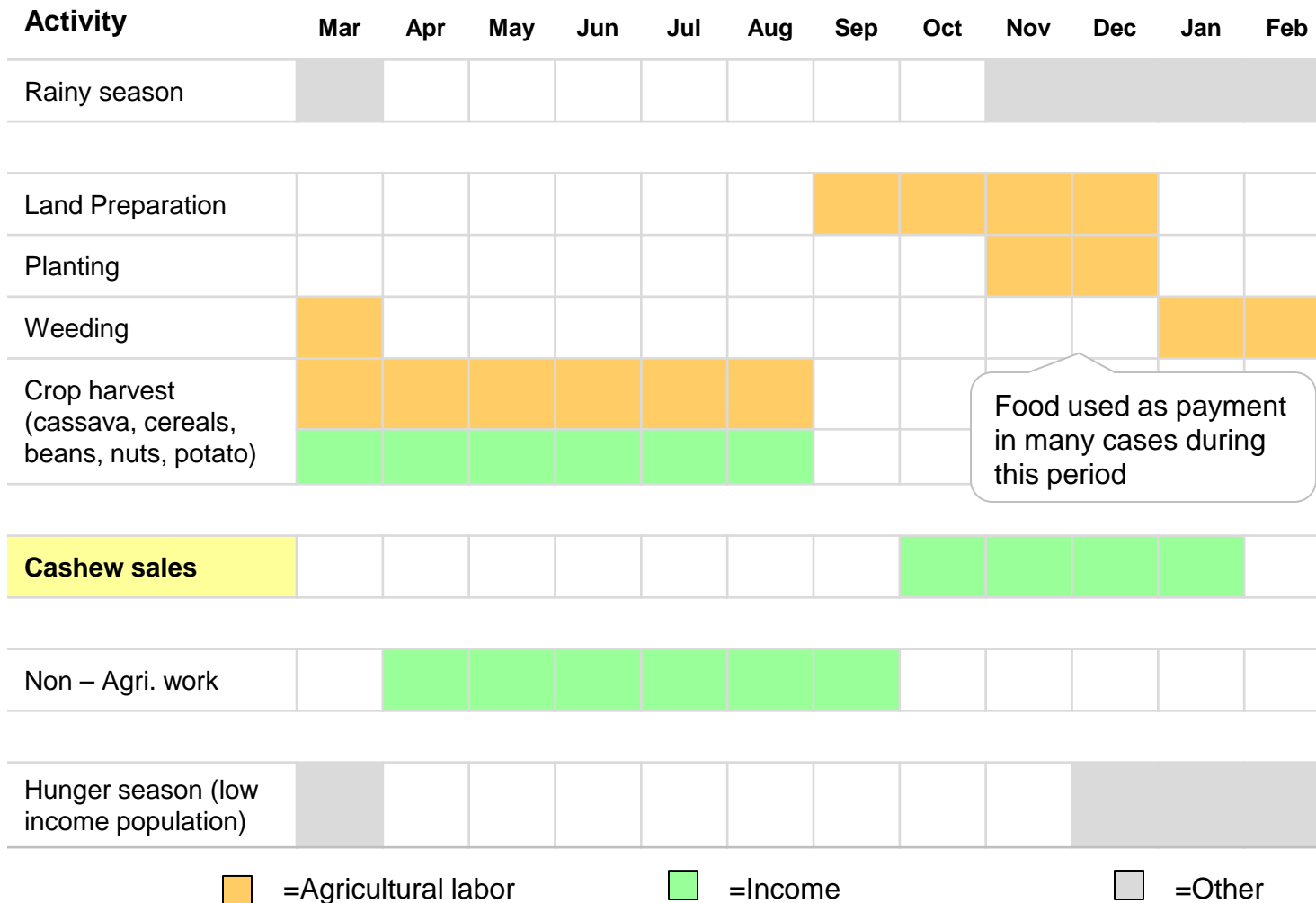
- **Cashew farmers**
- Processing factory workers

Quantitative economic impact of cashew processing industry

Initiatives to expand industry impact

Lifestyles and livelihoods of rural farmers are dictated by the agricultural calendar

Agricultural calendar – workload and income



Food used as payment in many cases during this period

Nearly all farmers produce a variety of crops. However, they sell only a portion of production, saving the majority for household consumption

Cashews harvesting is counter cyclical to most crops, making it a good compliment in terms of workload and income

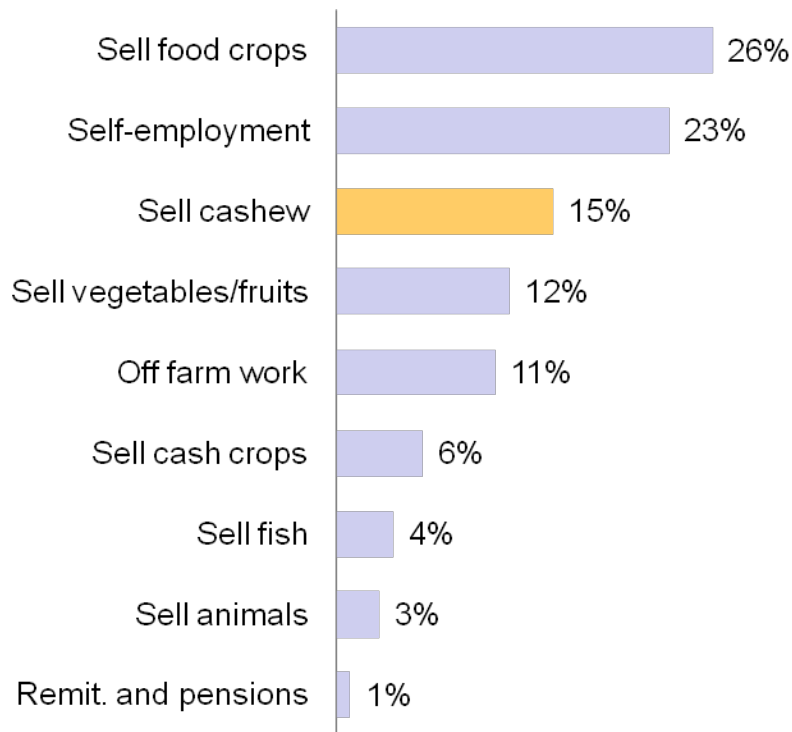
Low availability of food sources and income leads some poorer cashew farmers to sell earlier in the season at reduced prices

Source: Source: Chemonics International Inc/ FEWS NET "S. Nampula coastal agricultural livelihood zone profile" August 2008
 **Source: Save the Children Report, Coastal Region Integrated Food Security Program Survey Report, Nampula Province, (Nov 2006)

Cashews play an essential role in income generation for farmers in coastal areas in Nampula, traditionally food insecure districts

Most important income sources,

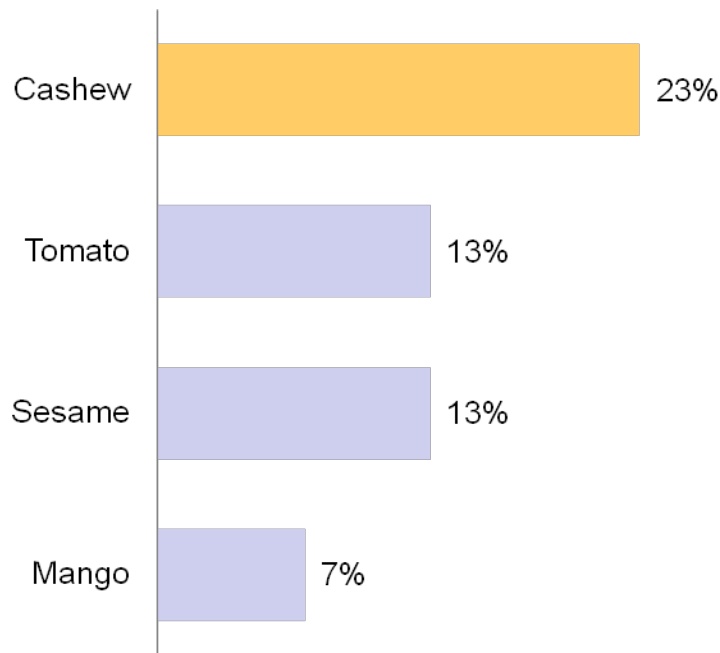
2006, survey of Nampula coastal districts



Sales generated from cashews are an important source of income for many families in coastal areas

Highest income single crop

2006, survey of Nampula coastal districts



****Note: all other responses <5%**

When each crop is considered individually, cashew is reported as the single most important crop in terms of income generated

Segmenting farmers by assets demonstrates that cashews play a significant role in income for relatively larger farmers

Farmer segmentation by production assets (2007/08)

Asset group	% Population	Land cult. (ha)	Trees	Annual cash income (MZN)
Better-off	10 – 15 %	3.0 – 4.5	100 – 300 cashew 5 - 25 coconut	24,000 – 38,000 (\$960 - \$1,520)
Middle income	25 - 35%	1.5 – 2.5	40 – 90 cashew 5 – 15 coconut	7,500 – 22,500 (\$300-\$900)
Poor	30 - 50%	0.5 - 1.0	15-25 cashew	3,500 – 5,500 (\$140-\$200)
Very poor	15 - 20%	0.25 - 0.50	5-10 cashew	2,000 – 5,000 (\$80-\$200)

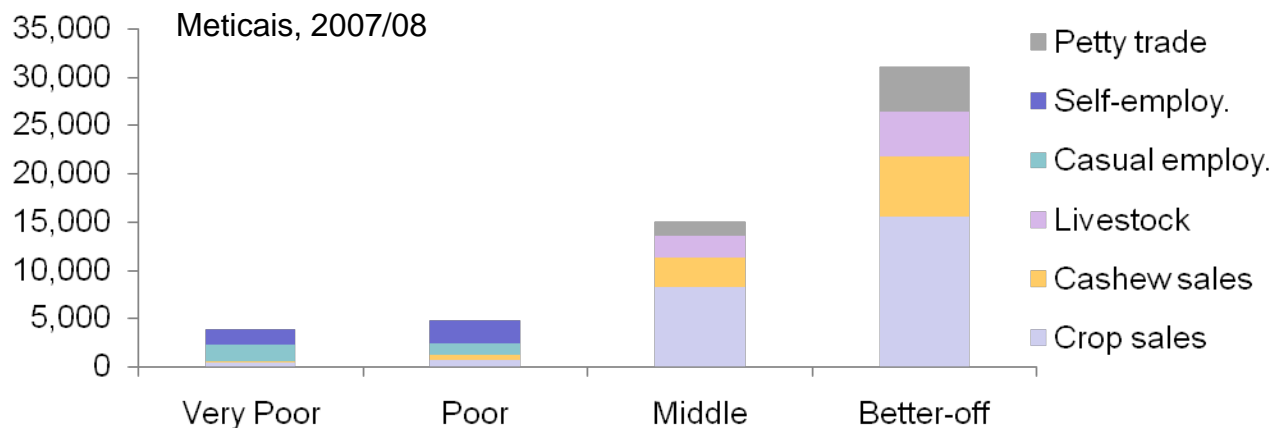
Cashews comprise a notable proportion of cash income for Middle and Better-off farmers

Farmers with more resources earn more per cashew tree due to:

- Selling crops later in the season when prices are higher
- Pesticide use
- Price premium for quality nuts

Annual cash income

Meticais, 2007/08



Annual cashew income (MZN)	~200	~480	~3,000	~6,200
% income from cashews	~5%	~10%	~20%	~20%

As a result of possessing additional resources, better-off farmers can earn substantially higher incomes per tree than poorer farmers

Per tree income based on farmers' assets

	Poorer farmers	Better-off farmers
Avg. farm gate price (MZN per kg)	7	10
Avg. yield per tree (kg per tree)	4	10
Add'l price premium for quality (MZN per kg)	0	0.75
Cost of pesticides (MZN per tree)	0	22
Net income per tree (MZN)	28 (\$1.12)	86 (\$3.42)

Reasons for differences

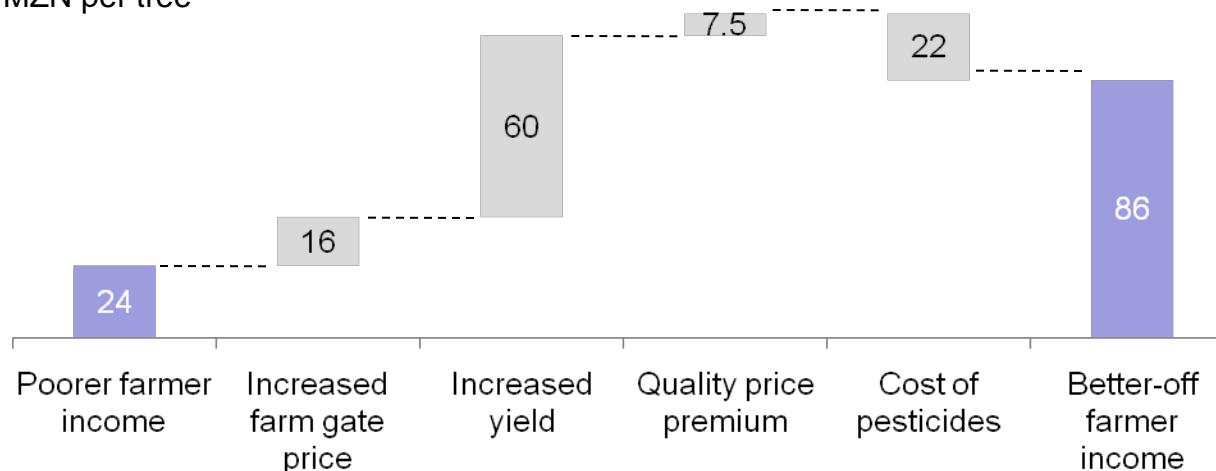
Better-off farmers, being less strapped for cash, are able to sell later in the season when prices are higher

Spraying trees with pesticides raises per tree yields

Farmers must produce a notable quantity in order to test for quality and receive premium

Average income per cashew tree

MZN per tree

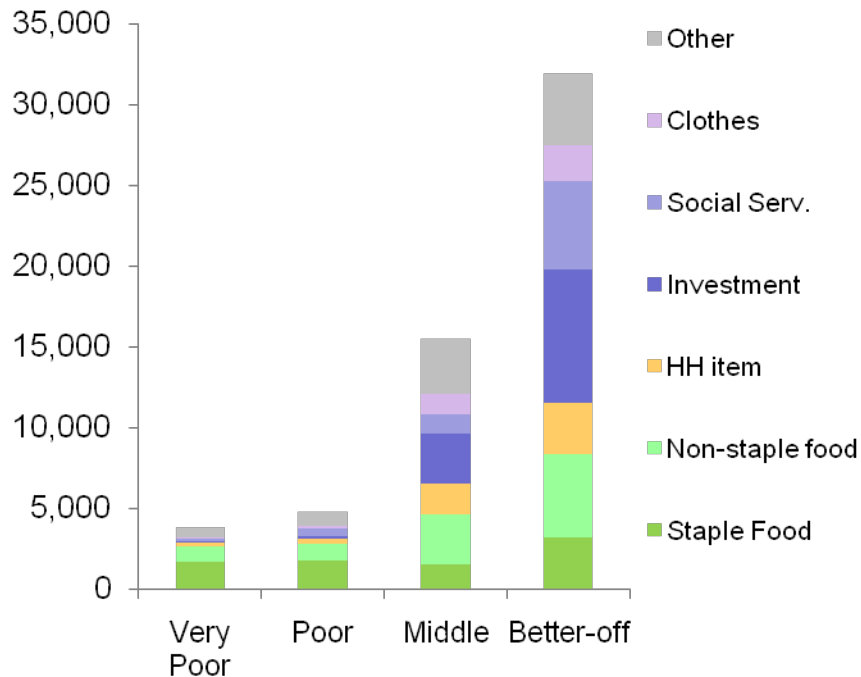


- Better-off farmers can earn more than 3 times more per tree than poorer farmers
- Enabling small farmers access to additional resources for investment can notably increase cashew income

For poor and very poor farmers spend the majority of income on food, thus preventing investment to improve livelihoods

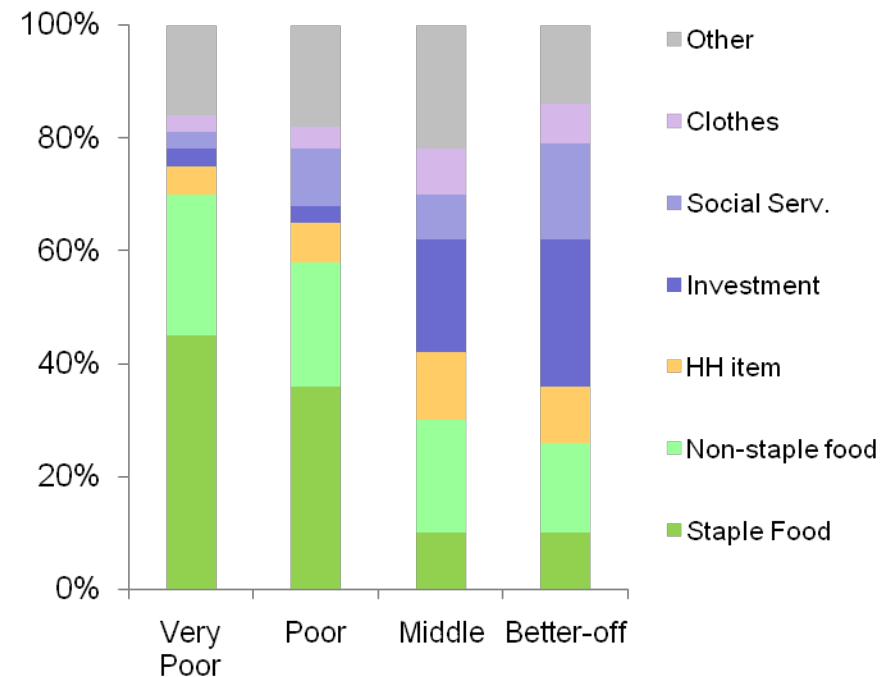
Farmers' expenditures

Meticais, 2007/08



Farmers' expenditures

Percentage, 2007/08



- Very poor and poor farmers have very little income available for non-food items, leaving essentially no resources available for investment
- Middle and Better-off farmers apply additional income to investment, thus enabling further income growth

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Cashew's role in the livelihoods of the rural poor

- Cashew farmers
- **Processing factory workers**

Quantitative economic impact of cashew processing industry

Initiatives to expand industry impact

A quantitative survey and qualitative interviews served as the basis for data collected about factory workers

Factory worker data sources

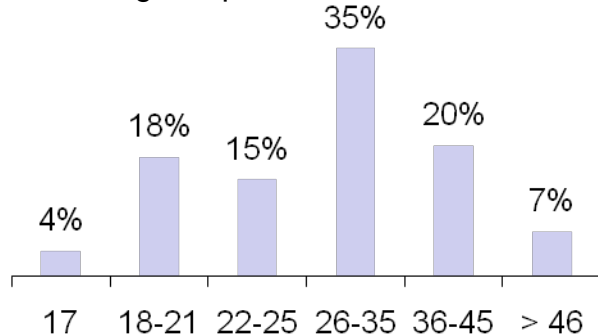
	Survey (Mar '08)	Interviews (Nov – Dec '08)
Type of research	Quantitative	Qualitative
# Factories	8	8
# Respondents	192	42
Provinces (# factories)	Nampula (6), Zambezia (1), Cabo Delgado (1)	Nampula (8)
Primary topics	<ul style="list-style-type: none"> • Personal background • Factory working conditions • Home living conditions • Household income 	<ul style="list-style-type: none"> • Home living situation • Daily routine • Work experience at factory • Ideas for factory improvement
Workers selected	<ul style="list-style-type: none"> • High, medium and low performers • Cutting, peeling and selection sections 	Cutting, peeling and selection sections
Language	Portuguese and local languages	Portuguese

Factory workers tend to have low levels of education and cite malaria as the most common health problem

Factory worker profile

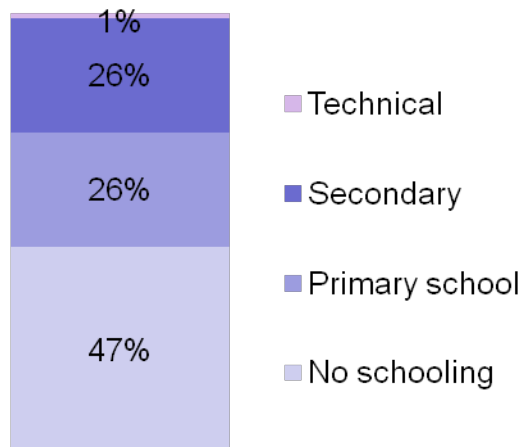
Age of workers

Percentage respondents



Level of education

Percentage respondents



Various estimates put illiteracy rates among workers as high as 80%*

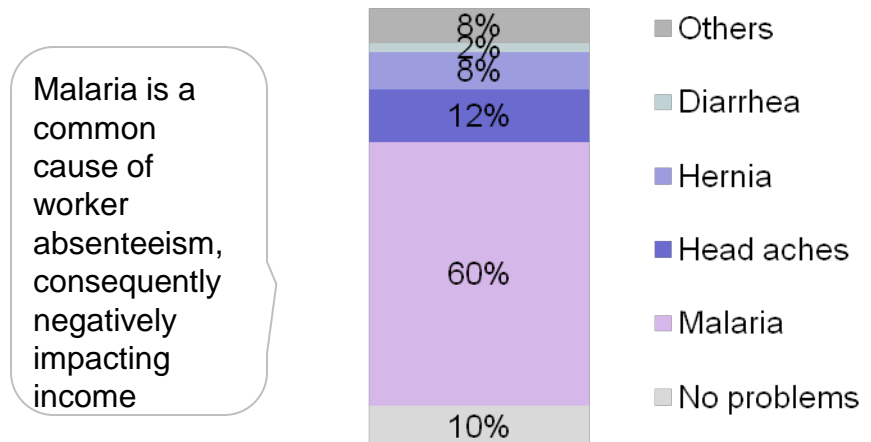
Knowledge of HIV / AIDS

Percentage respondents

Some knowledge and know how transmitted	61%
Some knowledge, but don't know how transmitted	30%
Little to no knowledge	9%

Ongoing health problems

Percentage respondents

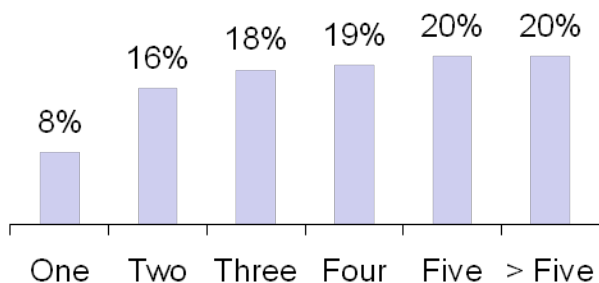


Malaria is a common cause of worker absenteeism, consequently negatively impacting income

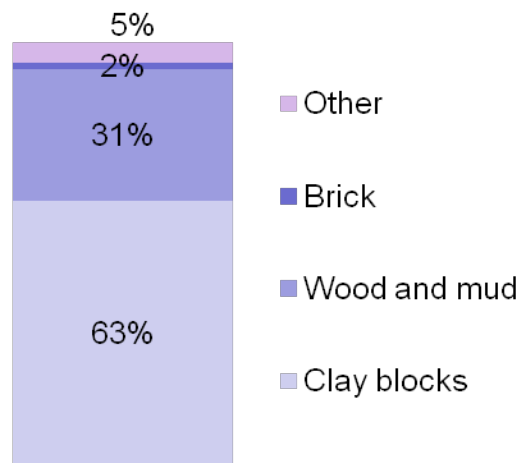
Home conditions for factory workers a very basic, with little access to potable water or sanitary facilities

Factory worker home living conditions

Number of members of household
Percentage respondents



Home construction material
Percentage respondents



Access to clean water
Percentage respondents

Potable water sources	Tap water	10%
	Well	12%
	Water hole	3%
Non-potable water sources	Public well	48%
	Other	12%
	Public water hole	10%
	River	4%
	Lake	1%

75% of workers do not have access to a source of potable water

Sanitary conditions
Percentage respondents

Toilet	Bathroom w/ running water	3%
	Bathroom w/o running water	62%
No toilet	Beach	5%
	Field	28%
	Other	2%

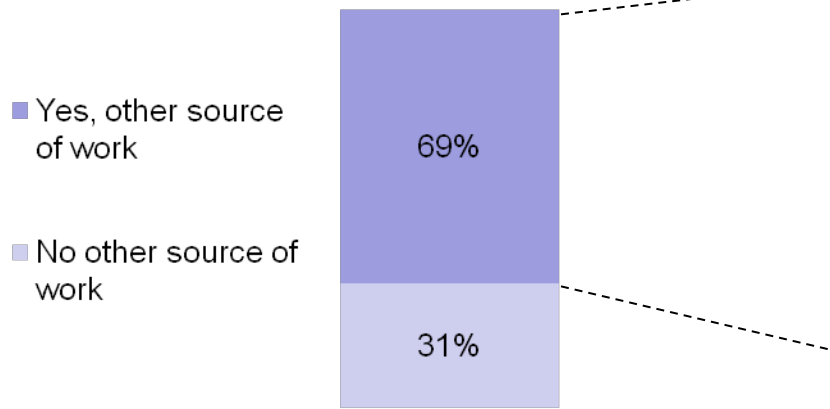
35% of workers do not have a toilet facilities of any kind

Although a majority of factory workers also perform in small holder agriculture, very few receive cash income from farming work

Household livelihoods

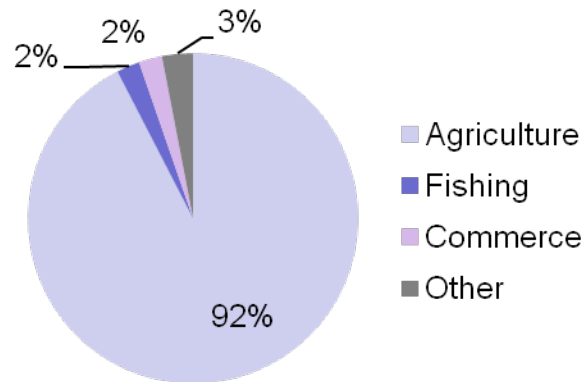
Sources of work

Percentage of respondents



Secondary sources of work

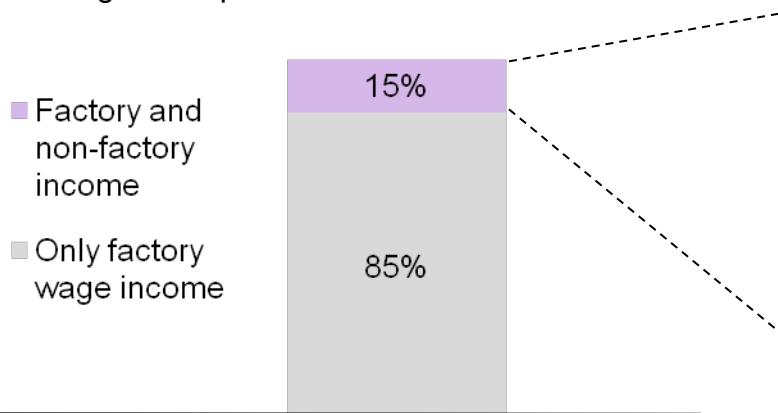
Percentage of respondents



Agriculture continues to play a large role in workers' livelihoods even after beginning work in factories

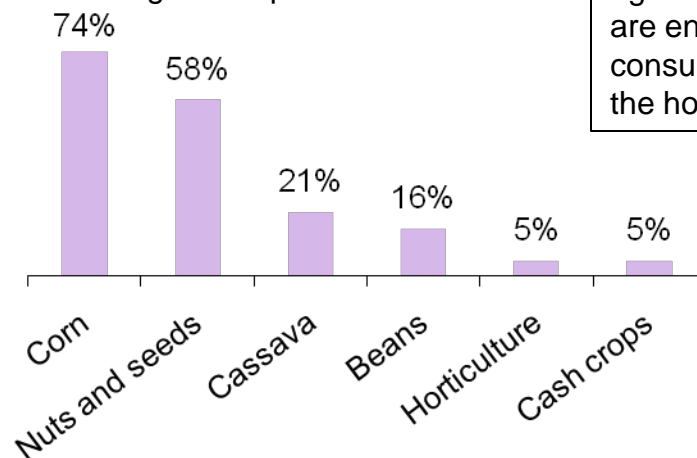
Sources of income

Percentage of respondents



Crops sold

Percentage of respondents



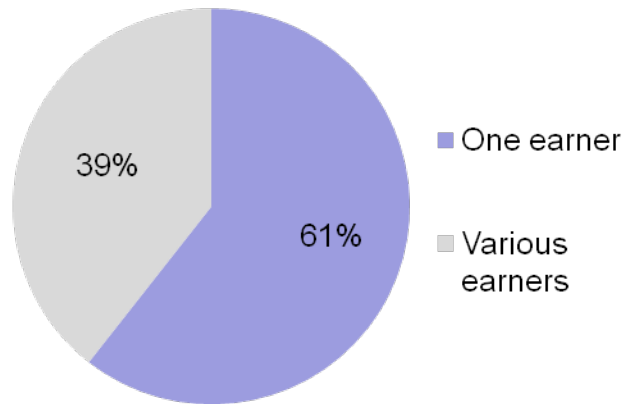
For the majority of workers who engage in agriculture, crops are entirely consumed within the household

Despite being the single wage earner in the majority of cases, factory workers are net senders of remittances

Worker income

Number of Income earners in household

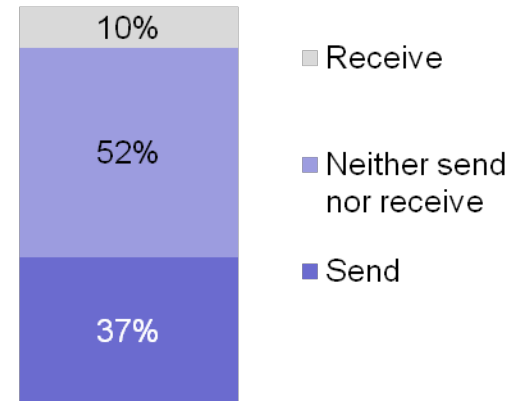
Percentage of respondents



Remittances

Percentage of respondents

Many factory workers are migrant workers, who regularly send money to their families



- The majority of workers are the single income producers, meaning that wages support upwards of four other household members
- Despite the financial pressures endured by factory workers, more than a third remit a portion of their income
- Due to remittances, factory wages provide income to the rural poor beyond the borders of the community that houses the processing factory

Work at the factories typically involves around a 10 hour day and is compensated based on individual productivity

Daily routine at factory

Time	Activity
4:00	Wake up – do not typically eat breakfast
4:15-5:00	Walk to factory (90% walk to work)
5:00-5:10	Arrive at factory and prepare for work
5:00-5:10	<i>Eat breakfast (a minority of factories provide breakfast, notably CondorCaju factories)</i>
5:10-11:00	Morning work session
11:00-12:30	Lunch
12:30-16:30	Afternoon work session
16:30-17:15	Leave factory and walk home
17:15	Arrive home

Factories are open six days per week, which implies that 26 days is a full work month

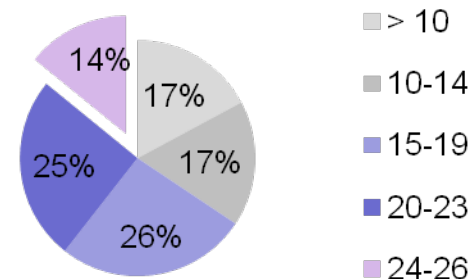
Due to absenteeism, actual average wages are less than figures shown

Compensation

$$\begin{array}{c} \text{Worker productivity} \\ \times \\ \text{Days worked per month} \\ = \\ \text{Compensation} \end{array}$$

Typical daily wage = 30MZN – 55MZN

Days worked per month



Assuming 26 days worked, typical monthly wages may reach between 780MZN and 1430 MZN (\$31* - \$57*)

*Assumes \$1.00 USD = 25 MZN

Source: Author interviews with workers at Nampula processing factories (routine); Wage data collected at Geba factory (Dec 2008); Technoserve document, "Labor Costs within Mozambique's Cashew Processing Factories:", (Dec 2006)

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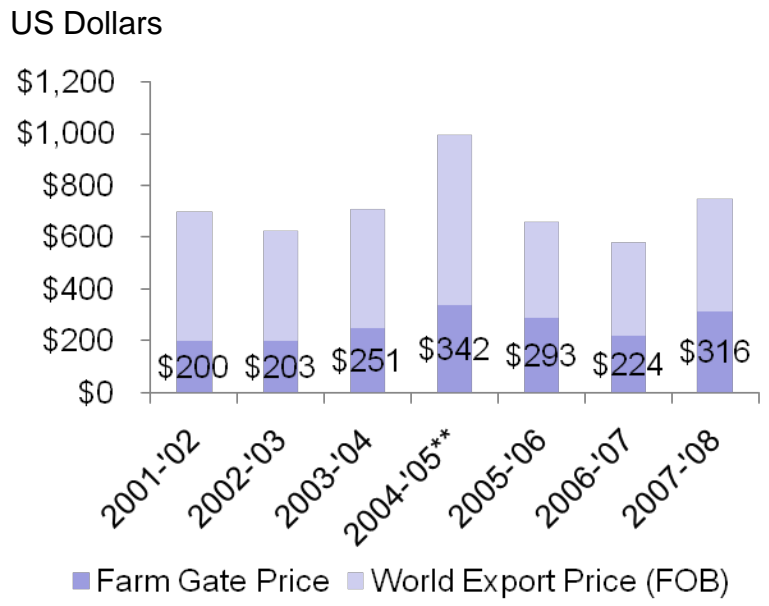
The emergence of the cashew processing industry has benefited some stakeholder groups, while negatively impacting others

Stakeholder groups	Metric of economic value	Impact of processing industry	Benefits (and losses)
1 Producers	Income from cashew production	Higher producers' share of export prices due to increased competition for raw nuts	Higher income due to increased share of export price
2 Traders & exporters	Profits from trade and export of raw nuts		(Decreased spread between farm gate and export price)
3 Processing factories	Operating profits	Factories operate in rural areas, thus creating employment in local communities	Profits earned
4 Factory workers	Wages and benefits		Wages earned
5 Government	Tax revenue	Shift in tax revenues from raw exports to factory-related tax	Tax revenue from cashew factories (Foregone tax revenue from exported raw nuts)
6 Local communities	Activity within local economy	Factory wages spent on consumer goods	Development and diversification of local economy

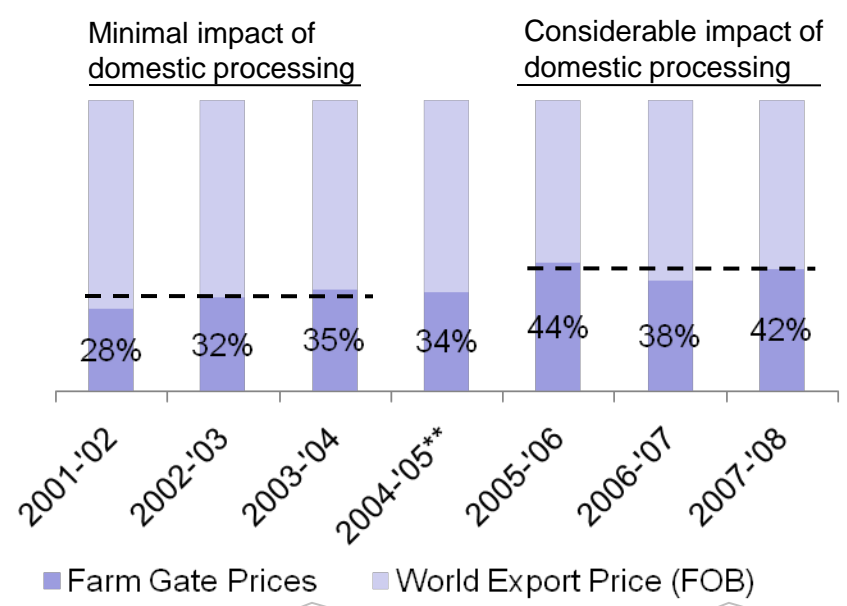
Sum is the aggregate impact of the emergence of the domestic processing industry

Increased competition for raw nuts driven by domestic processing has contributed to increasing producers' share of export prices

Farm gate and export prices (FOB)



Producers' share of export prices (FOB)



Assumptions

- Overall quantity of national raw nut production has not been noticeably affected by the processing industry
- Mozambican export prices are highly correlated to world export prices*
- The domestic processing industry has a considerable impact on demand for raw nuts once >30% of total production is processed domestically

Average farmers' share 2001-2004 = **32%**

Average farmers' share 2005-2008 = **42%**

- Increased competition between exporters of raw nuts and domestic processors has contributed to increasing farmers' share of export prices
- A portion of the 10% increase in farmers' share of export prices should be attributed to the domestic processing industry

*Note: World export prices used due to lack of reliable export data from a single source covering the period in question

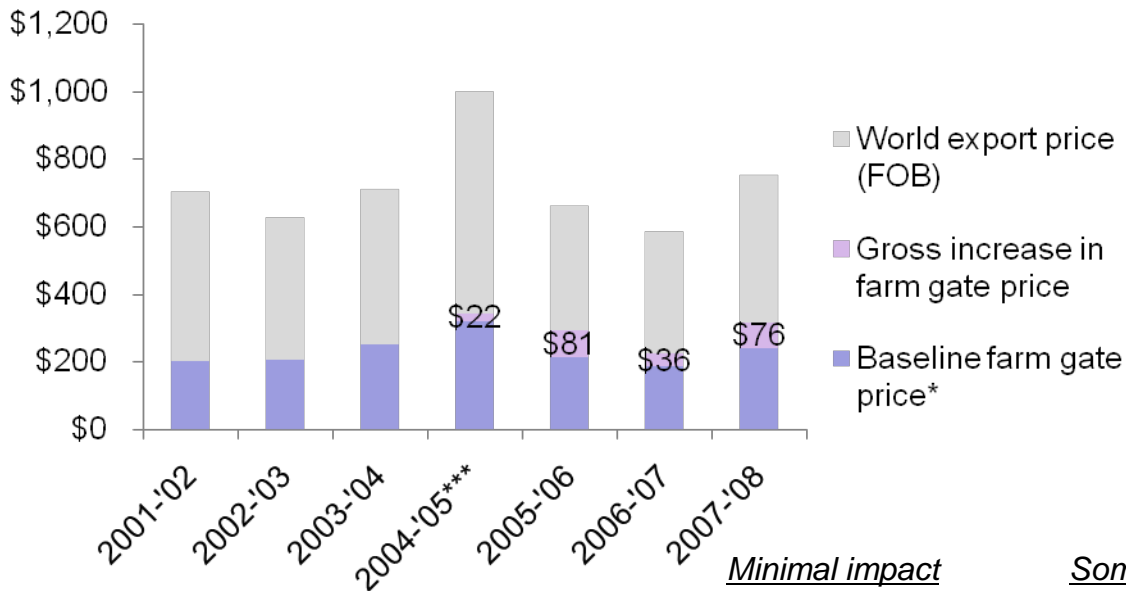
**Note: Due to large discrepancies across data sources for export prices for the 2004-'05 season, the ACA data for Mozambique was used for 2004-'05

Source: INCAJU for farm gate prices; IPEX data for export prices; author's calculations for total nut production (see appendix)

As domestic processing has expanded, the processing industry's impact on producers' share of export prices has also increased

Gross increase in farm gate prices

US Dollars per ton (000s)



- Increased competition for raw nuts between exporters and processors has applied upward pressure on farm gate prices
- Although the processing industry played an essential role in this price increase, only a portion of the increase should be attributed to it*
- It is assumed that between 25% and 50% of the increase in farm gate prices should be attributed to the processing industry, with the remainder due to other market forces

	<i>Minimal impact</i>			<i>Some impact</i>		<i>Considerable impact</i>	
	'01-'02	'02-'03	'03-'04	'04-'05	'05-'06	'06-'07	'07-'08
% Total raw nut production processed domestically	0%	1%	6%	11%	35%	38%	36%
Assumed % of farm gate price increase attributable to processing industry**	0%	0%	0%	25%	50%	50%	50%
Farm gate price increase attributable to processing industry (USD per ton)	\$0	\$0	\$0	\$5	\$41	\$18	\$38

*Other factors contributing to higher farm gate prices include increase in number of exporters, rise of farmers associations and increase in money laundering (which may lead to paying at least of 10% above market prices)

**Note: In place of a single value, a range could also be used. However, a single value was used for the sake of simplicity and clarity.

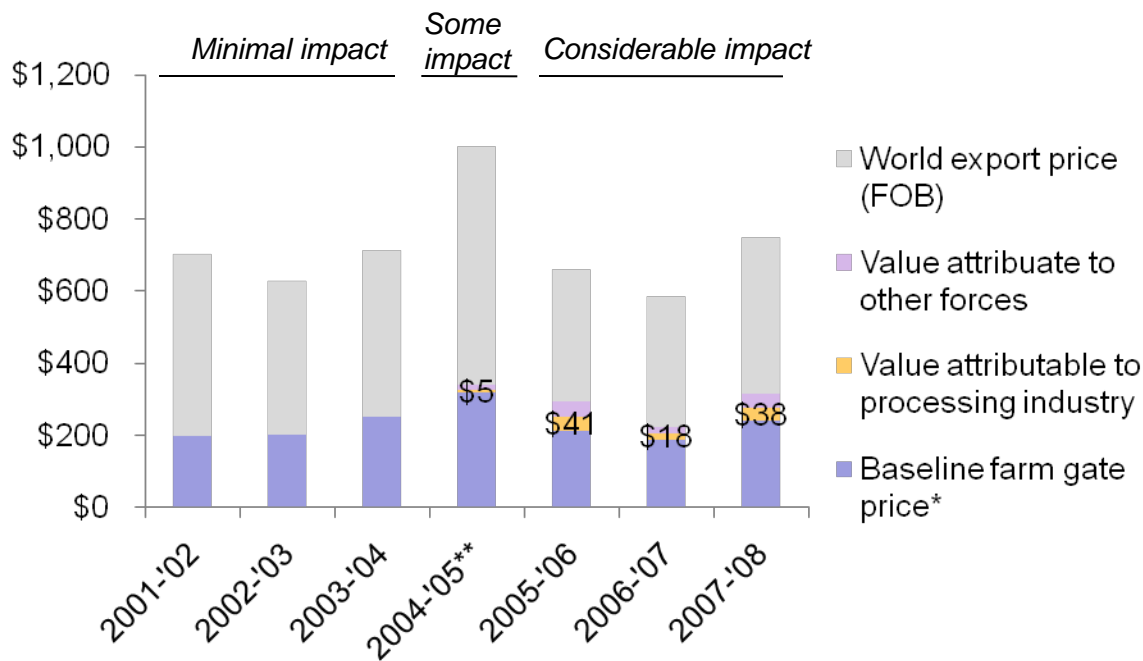
***Note: Due to large discrepancies across data sources for export prices for the 2004-'05 season, the ACA data for Mozambique was used for 2004-'05

Source: INCAJU for farm gate prices; IPEX data for export prices; author's calculations for total nut production (see appendix); Technoserve interviews

Increased competition for raw nuts increased farmers' share of the farm gate price beginning in the 2004-'05 season

Benefit to producers attributable to processing industry

US Dollars per ton (000s)



$$\begin{aligned}
 & \text{Producers' Benefit} = \\
 & \text{Increase in Farmers' share of} \\
 & \text{Export Price} \\
 & \quad \times \\
 & \text{Proportion of increased share} \\
 & \text{due to processing industry} \\
 & \quad \times \\
 & \text{domestic cashew production}
 \end{aligned}$$

▼

Total Producers' benefit

2001-'08 = \$6,177,000

2007-'08 = \$2,483,000

	2004-'05	2005-'06	2006-'07	2007-'08
Nat'l raw nut production (tons 000s)	82	56	55	65
Net impact (USD 000s)	\$447	\$2,251	\$995	\$2,483

*Note: For 2001-'04, baseline farm gate prices are actual values. For 2004-'08, they designate 32% of the world export price, which is the average for 2001-'04.

**Note: Due to large discrepancies across data sources for export prices for the 2004-'05 season, the ACA data for Mozambique was used for 2004-'05

Source: INCAJU for farm gate prices; IPEX data for export prices; author's calculations for total nut production (see appendix)

Traders are negatively impact by increased competition for raw nuts due to a slimmer spread between farm gate and export prices...

Losses to traders and exporters

Trader and exporter benefits	$\text{Traders' and exporters' share of export prices} = \text{Export price (FOB)} - \text{Farm gate price}$				
Impact of increase in producers' share of export prices	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Farm gate price (producers' share) </div>		Recent increases in producers' share of export prices have caused declines in traders' and exporters' shares of export prices		
	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Traders' & exporters' share </div>				
Losses attributable to processing industry	<ul style="list-style-type: none"> • Only a portion of total traders' and exporters' loss of share of export prices is attributable to the processing industry • Losses attributable to the processing industry are exactly equal to the gains made by producers attributed to the processing industry 				
Revenue to profits	<ul style="list-style-type: none"> • Economic losses should be in terms of profits, so procurement costs of 50% need to be factored in* 				
	2001-'04	2004-'05	2005-'06	2006-'07	2007-'08
Benefits to producers (USD 000s)	\$0	\$447	\$2,251	\$995	\$2,483
Losses to traders & exporters (USD 000s)	\$0	(\$224)	(\$1,125)	(\$498)	(\$1,242)

Traders' and exporters' loss=

Decreased share of export prices

x

National production

x

*Profit margin**

Total impact on traders and exporters

2001-'08 =

(\$3,088,000)

2007-'08 =

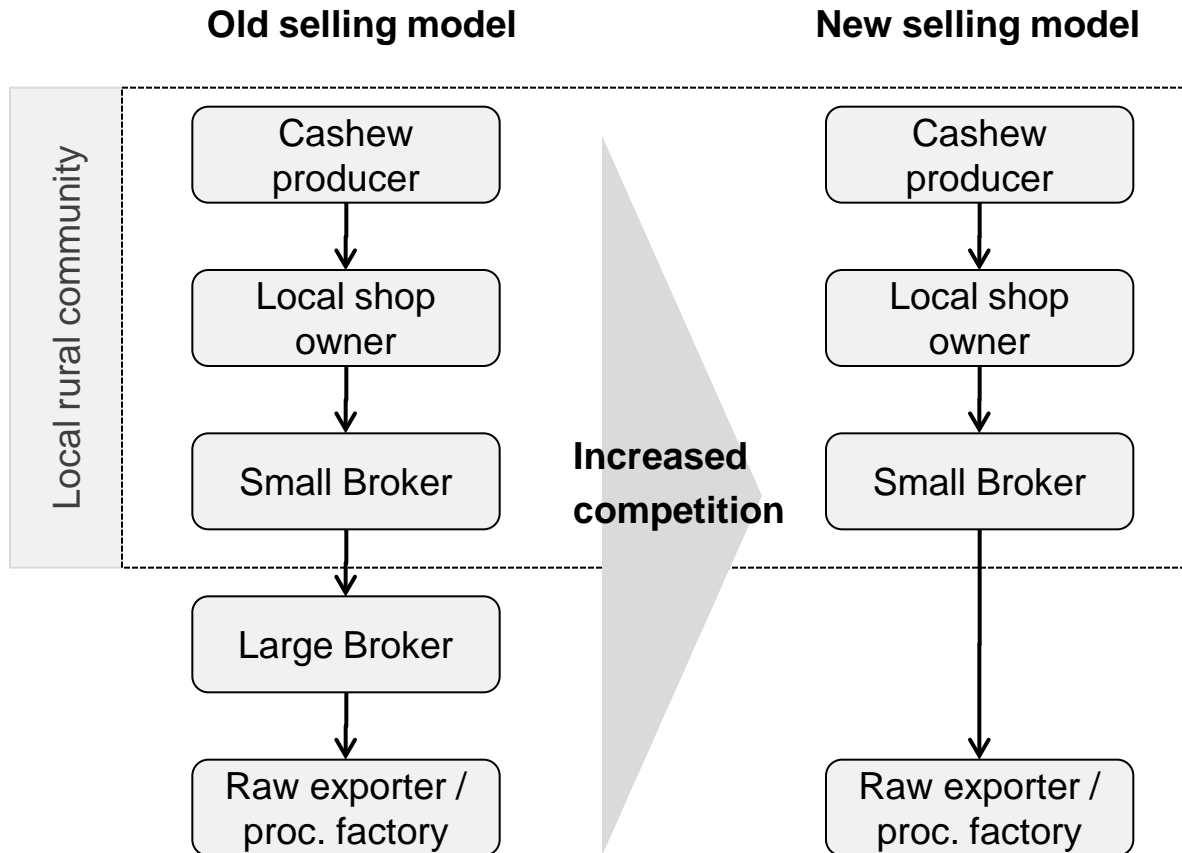
(\$1,242,000)

Note: calculations do not account for losses due to foregone exports of raw nuts that are processed domestically. However, these losses are partially offset by gains in exports of processed kernels.

*Source: McMillan, 'When Economic Reform Goes Wrong: Cashews in Mozambique', Harvard University (2002)

...however, much of the losses to traders fall outside local community members due to the squeezing out of the “large broker”

Evolution of the cashew selling model



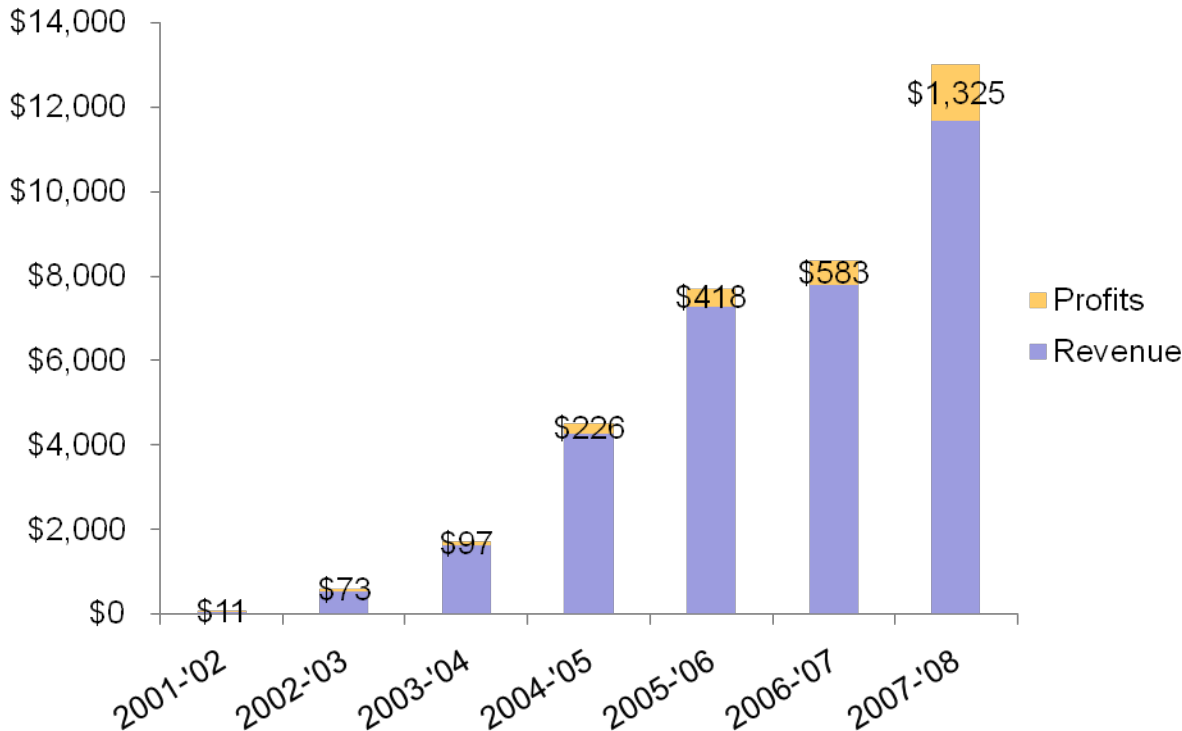
- As a result of the increasing difficulties associated with procuring large quantities of raw nuts, the large broker has been squeezed out of the market
- The need for local shop owners and small brokers, who are members of local communities, remains largely the same
- Removal of one intermediary between cashew producers and final buyers has contributed to gains in farmers' share of export prices
- Efficiency gains have been realized as raw nuts sales to processors located near cashew production sites increases, brokers transportation costs decrease

Economic benefits to processing factories are measured by profits, which have grown year-by-year

Benefits to processing factories

Processing factory profits

US Dollars (000s)



Profit margin	2001-'02	2002-'03	2003-'04	2004-'05	2005-'06	2006-'07	2007-'08
	12.6%	11.9%	5.6%	5.0%	5.4%	7.0%	10.2%

Processing Factories' Economic Benefit=

Operating profits



Total processing factory benefits

2001-'08 = \$2,732,000

2007-'08 = \$1,325,000

Note: Revenue sections of bars shown are net of profits

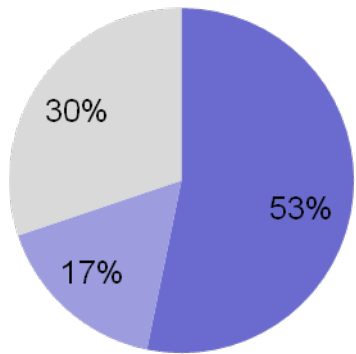
Source: Technoserve data

Profitability of processors is greatly impacted by fluctuations in the margin between raw nut and processed kernel prices

Spread between raw nut and processed kernel prices

Production costs

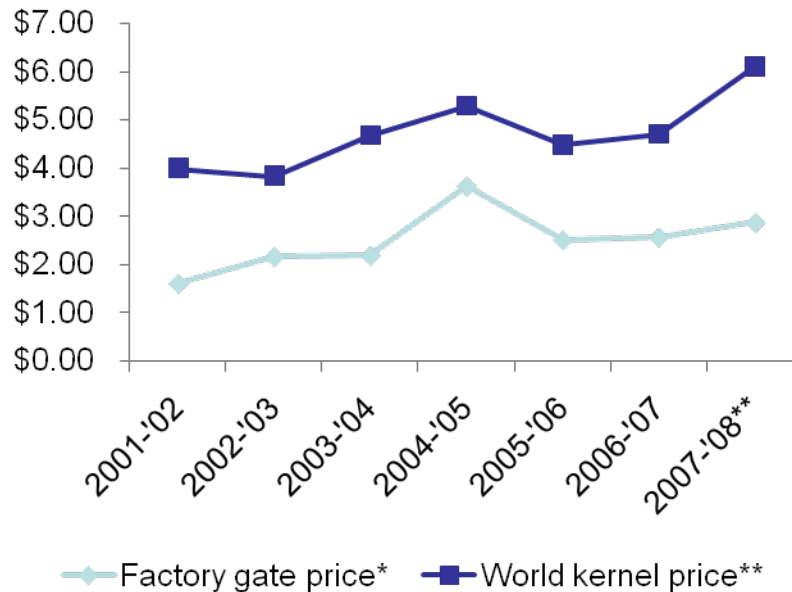
2005-'06



- Raw nut costs
- Labor
- Other

Raw nut and processed kernel prices

US Dollars per kilo



Spread between kernel and raw nut prices

Industry profit margin

	'01-'02	'02-'03	'03-'04	'04-'05	'05-'06	'06-'07	'07-'08
Spread between kernel and raw nut prices	\$2.39	\$1.68	\$2.49	\$1.66	\$1.97	\$2.13	\$3.24
Industry profit margin	12.6%	11.9%	5.6%	5.0%	5.4%	7.0%	10.2%

Nine new factories opened from '03-'06

- Raw nut costs comprise the largest portion of processing factories' total operating costs
- Profitability of processing factories is largely impacted by the spread between raw nut and kernel prices
- Low profit margins between '04-'06 were caused by both a small spread between raw nut and kernel prices as well as the opening of new factories
- High prices for kernels in 2008 helped to increase profit margins

* Note: Factory gate prices shown correspond to kernels, which are assumed to be 20% of the weight of raw nuts. Kernel prices cover Nov - Dec.,

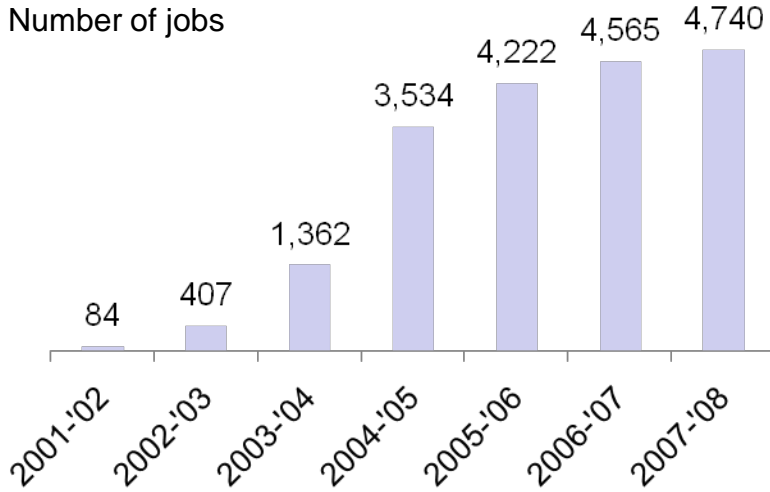
**Note: 2007-'08 world kernel prices includes through June '08

Employment in processing factories has provided benefits to workers in the form of wages

Benefits to factory workers

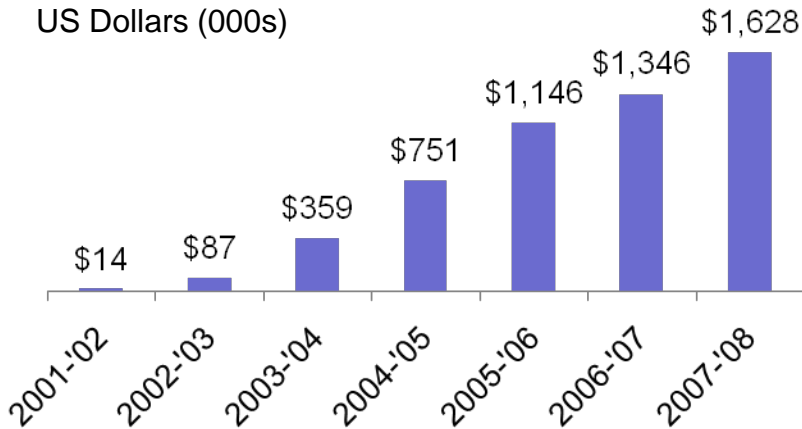
Factory employment

Number of jobs



Wages paid to workers

US Dollars (000s)



*Economic benefit to workers =
total wages –
opportunity cost of labor*

*Opportunity cost is the value of
alternative employment options*

*Opportunity cost = 0 ***

*Economic Benefit to workers =
total wages*

Formal alternative employment opportunities are very scarce in rural areas, thus the opportunity cost of foregone employment options is assumed to be zero.

Total Workers Wages

2001-'08 = \$5,331,000

2007-'08 = \$1,628,000

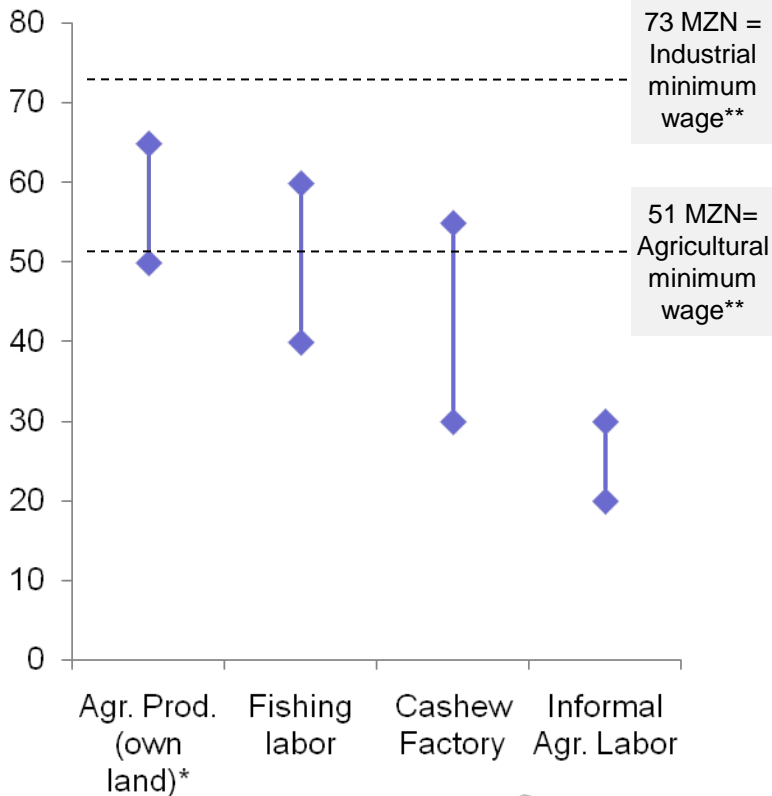
Source: Technoserve data

**Source: McMillan, 'When Economic Reform Goes Wrong: Cashews in Mozambique', Harvard University (2002)

Cashew factory employment provides a better-paying and more dependable source of income relative to informal agricultural labor

Typical rural daily wage ranges

Meticais per day



One ha. provides 6-15 days of work per month, typically in Nov. – Mar.

Fishing is only an option on the coast and not possible all days due to weather and tides

Cashew factory wages

- Wages from cashew factories are noticeably higher than informal agricultural labor, which is typically the only work alternative in rural areas
- Cashew factory labor also provides a dependable source of income, which is not common in rural areas, especially outside of the planting and harvesting seasons
- Factory work also viewed as a quick way to access cash for urgent or unexpected expenses

Small holder farmer production

- Working on one's own small holder farm may yield a higher daily return than working at the factory*
- However, one hectare of land only typically demands 6-9 days of labor per month
- As a result, many small farmers supplement small scale farming work with factory labor
- Factory worker absenteeism rates tend to increase during the harvesting seasons and typically range between 3-15 days missed per month, supporting the supposition that workers use factory work to augment income earned from small scale farming

*Note: Assumes that 1 hectare produces 5,000 MZN per year and requires between 75 and 100 annual person days of labor

**Note: Divides 2008 monthly minimum wages for Industry and Agriculture (1,892MZN and 1,315MZN, respectively) by 26 working days per month

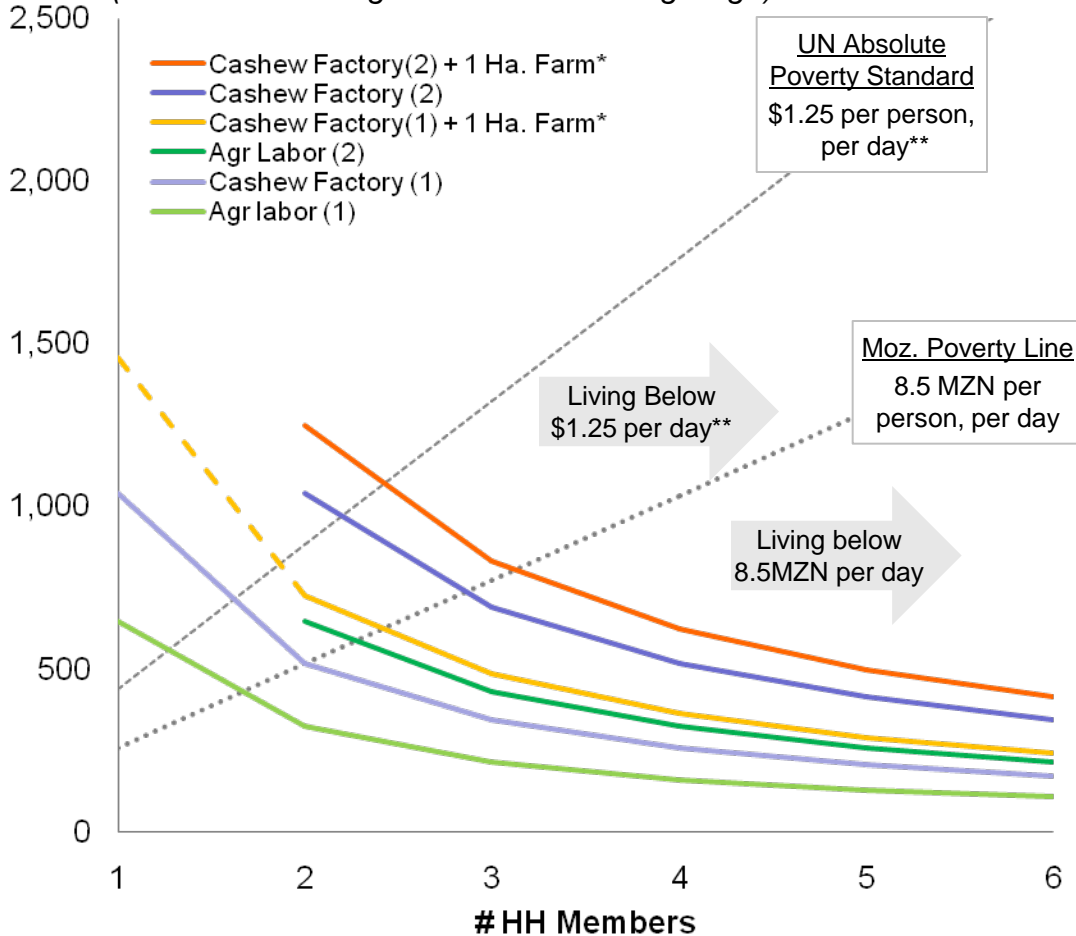
Source: USAID, THEMATIC BRIEFING PAPER 2: JUST HOW POOR ARE 'THE POOR?', (Jul 2008); Author's interviews with factory workers in Nampula province (Nov '08)

Cashew factories provide much needed income to families that live on very meager income levels

Income and poverty thresholds

Monthly income per household member, Meticais 2006-'08

(Parentheses designate # in HH earning wage)



Household characteristics

- 61% of workers in cashew factories are the sole wage earner in the household
- 76% of workers reported having a household size of three or more
- 40% reported having a household with five or more members

- Most rural households in Nampula live on under \$1 per day, per person
- Among households with 3 or more members, most live on under 8.5 MZN per person per day
- Income from cashew factories provides dependable income to impoverished rural families with few other employment alternatives
- In cases where two household members work in the factory, it is common for one to take time off to work on the farm while the other works in the factory

Note: chart assumes 26 days worked per month

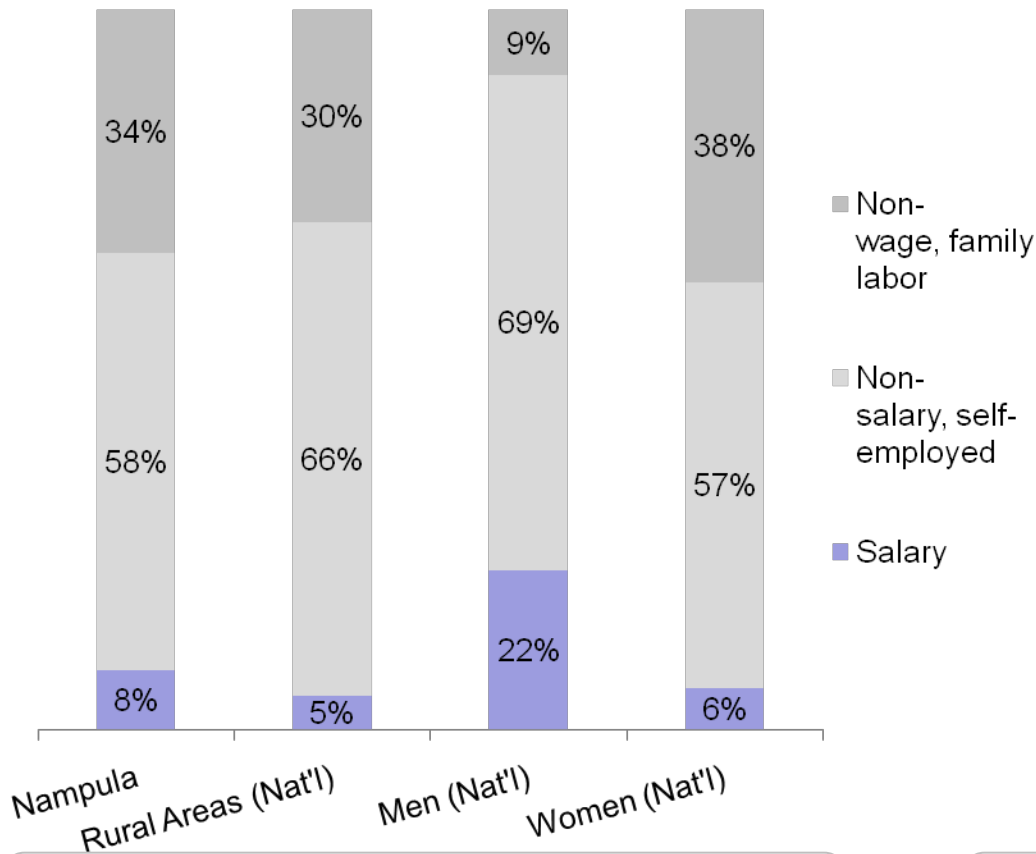
*Note: Refers to a one hectare small producer plot of land. Assumes that 1 hectare produces 5,000 MZN per year and requires between 75 and 100 annual days of labor.

**The \$1.25 dollar per day standard adjusts for PPP (purchasing power parity), which is 2.12 for Mozambique in 2005.

Cashew factories provide formal sector jobs with dependable incomes, which are uncommon in rural areas, especially among women

Source of employment

Percentage, 2004/05



- The formal economy in the Nampula province provides very few jobs with dependable incomes
- In rural areas, only one out of every 20 jobs provides a salary, many of which are highly coveted government positions
- Women occupy substantially fewer formal sector jobs than men

- Cashew factories, in many cases, provide the only formal sector jobs available to non-skilled workers in rural areas
- Cashew factories provide a valuable source of formal employment to women

“When you see a smoke stack from a factory in the bush, you know it’s a cashew factory because there is no other industry in rural areas” – Shakti Pal

When the cashew factory opened in Namige in 2001, 1,000 people applied for 70 positions in the factory*

Source: Instituto Nacional de Estatísticas

*Source: Hanlon and Smart, “Há mais bicicletas – mas há desenvolvimento?”, (2008)

Wage income earned from factories improves workers' financial stability due to the dependable nature of wage income

Qualitative impacts of factory wage income

Dependable cash income

Access to goods

- Local shops allow factory workers to purchase goods (clothing, etc.) on credit until wages paid at end of month
- No interest charged for purchasing goods on credit

Money lending

- Typical lending rates from money lenders is 25% - 50% monthly interest rate (1,355% - 12,875% APR)
- Factory workers are less dependent on lenders because they (as well as family members and neighbors) have access to a dependable source of cash from the factory

Savings / Investment

- By lessening dependence on money lenders and augmenting income from small scale farming, factory work enables saving
- Savings are commonly reinvested in housing, agriculture or saved for family emergencies

Income diversity

- Diversifying income beyond small scale farming provides security against a poor agricultural harvest in any given year
- Earning factory wages enables workers to pay others to work on their small scale farm (payment for labor must be made promptly, and cannot be deferred until the harvest)

Factory worker perspectives

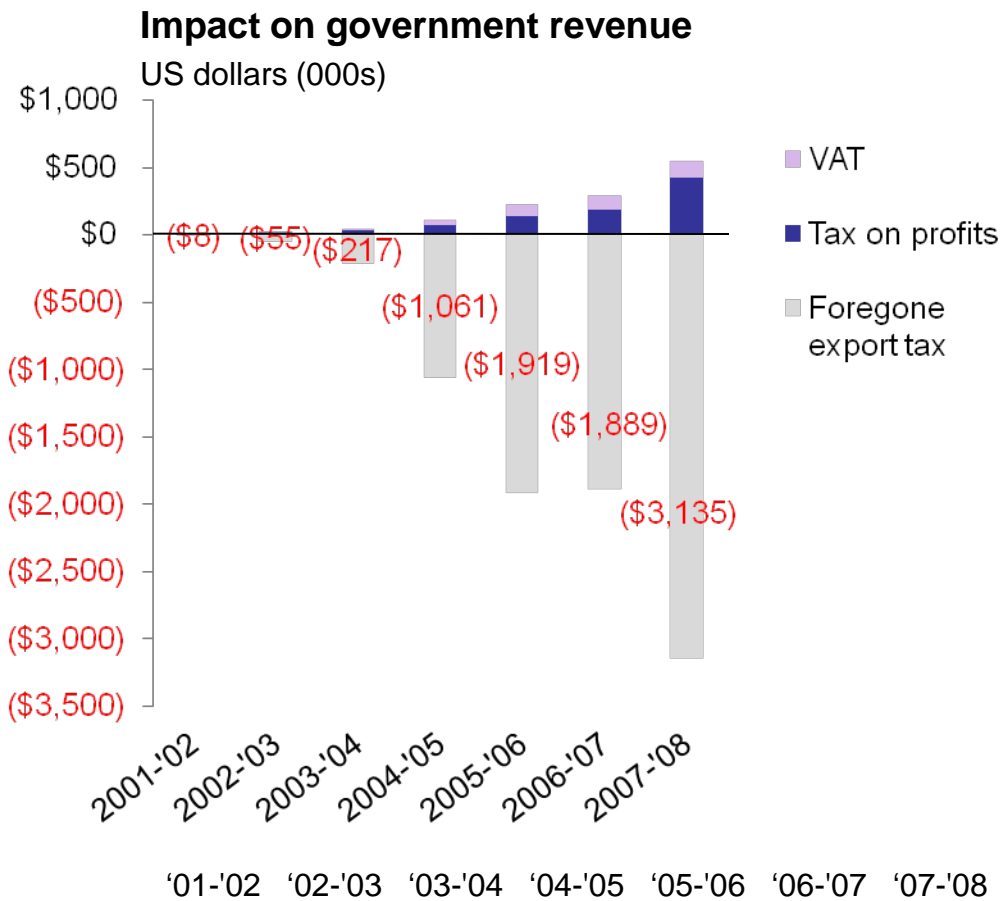
"When you can't work because you're sick and haven't eaten for two days, you don't have any other choice but to pay 50% interest... You need to feed your family."

"By working in the factory, you can get by from month to month on the salary. Once you harvest your crops from your plot of land, you can save a few hundred meticaís for when you can't work or have an emergency."

"We have problems in this area because the soil isn't great and the rainfall is unpredictable. You don't know what crop production will be from one year to another"

Although the government does receive tax revenues from factories, these are heavily outweighed by the foregone export tax on raw nuts

Benefits and losses to government



Economic benefit to gov't = tax revenue from processing factories – opportunity cost

Tax revenue = income tax on factory profits + Value added tax (VAT) on imported production goods

Opportunity cost = value of foregone raw nut export tax for nuts processed domestically

Total impact on government

2001-'08 = **(\$7,051,000)**

2007-'08 = **(\$2,595,000)**

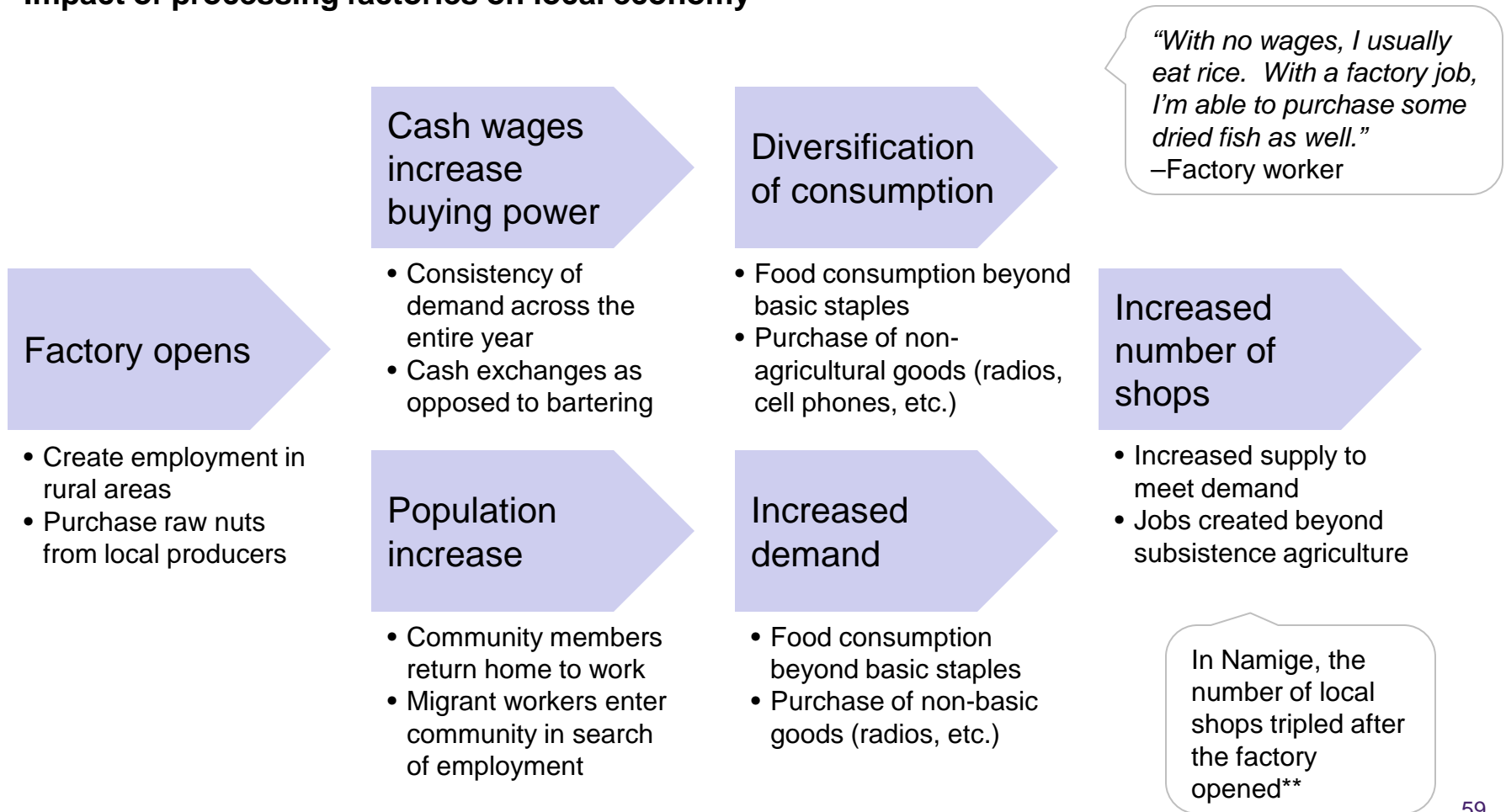
	'01-'02	'02-'03	'03-'04	'04-'05	'05-'06	'06-'07	'07-'08
Net impact (USD 000s)	(\$4)	(\$29)	(\$175)	(\$950)	(\$1,697)	(\$1,601)	(\$2,595)

Note: Assumes 32% tax on factory profits 17% VAT tax on imported production goods (packaging and consumables) and 18% tax on export of raw nuts
Source: Technoserve data (processed quantities); INCAJU data (FOB export prices); Technoserve interviews; author's calculations

The presence of cashew factories impacts rural communities by stimulating local economies

Benefits to local communities

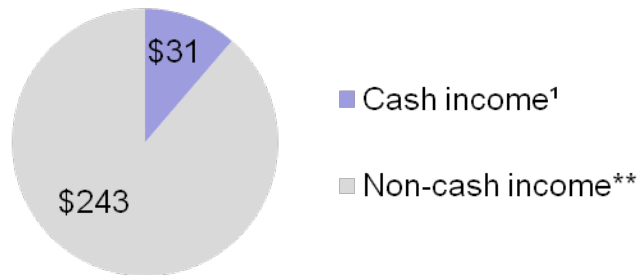
Impact of processing factories on local economy



Wages paid to factory workers have a disproportionately large impact on consumer spending, which spurs development of local economies

Annual GDP per person, Nampula province

USD, 2006



Cash income is a proxy for consumer spending in local economies

- Small holder farmers typically earn very little in the form of cash, with the vast majority of crops consumed within the household
- In contrast to small holder farming or agricultural labor, factory wages are always paid in cash
- Although factory workers may comprise a small proportion of the community, they account for disproportionate amount of consumer spending in local economies

Factory wages impact on consumer spending *Illustration*

	Community	Factory workers
Annual cash income per person (USD)	\$31	\$384*
Population	24,500	500
% Population	98%	2%
Cash in circulation (USD)	\$759,500	\$192,000
% total cash in circulation	80%	20%

Impacts of developing cash economy

- As cash incomes rise, so does consumer spending
- With the increase in consumer spending, local business supplying goods and services expand to meet the expanding demand
- Cash income also enables investment in agriculture, education and living conditions, thus further stimulating the growth of the local economy

* Assumes 20 days worked per month, and 40 MZN earned per day

**Note: Non-cash income includes agricultural production consumed within households, bartering of goods and wages paid in food or others goods

¹Source: Hanlon and Smart, "Há mais bicicletas – mas há desenvolvimento?" (2008)

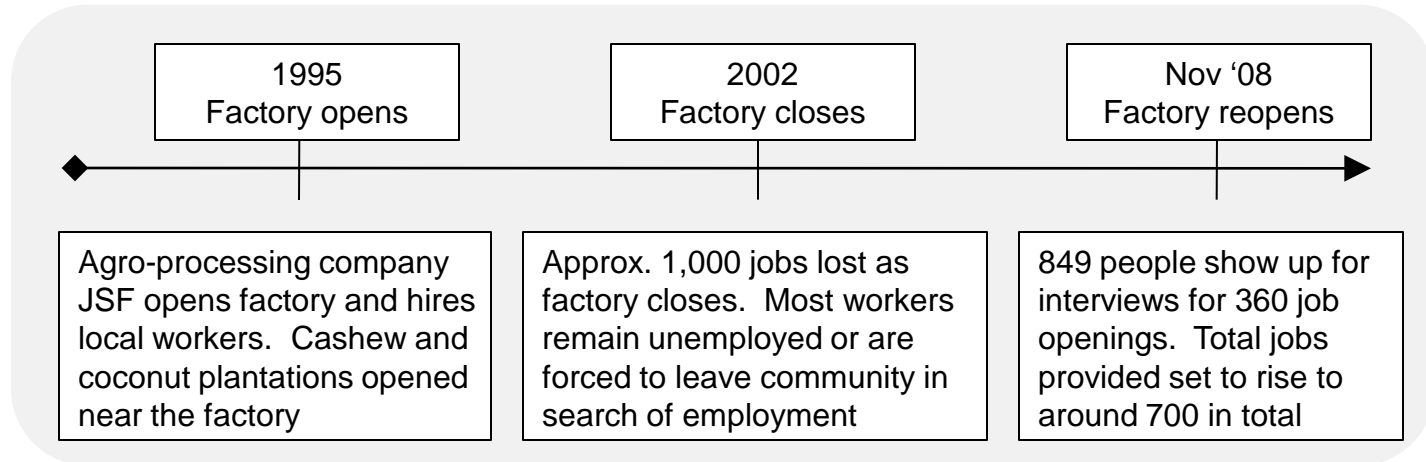
Source: INE (GDP per person); authors' calculations

The closing, and subsequent reopening, of a factory in Geba demonstrates factories' positive impact on local communities

Case study: Geba, Nampula

Background

- Located on the coast in Memba province
- Around 10,000 residents
- Fishing and small-scale farming primary livelihoods



Factory closure

“When the factory closed, I spent a few months unemployed and then had to leave Geba in order to find work. After a few years away, it’s great to be working in my community and living with my family again.”
-Factory worker

“Without factory work, you still need money to buy everyday things, so you divide your crops into what you eat and what you sell... In this way, everything runs out early. Food runs out early, and money runs out early too.” -Resident

Factory reopening

“Now that the factory is open again, there’s a feeling of courage... People are working and think ‘I’m going to build up my home. I’m going to bring electricity to my house.’ “ –Resident

“People now have the courage to continue the development of the town that was underway before the factory closed.” -Resident

“There’s hope again in the community, especially among young people and women. There is activity and jobs here again, which raises the outlook for the town.”
–Community leader

“This is the new world of Geba” –Resident

The rise of the processing industry has positively impacted farmers, processing factories and factory workers

Aggregate economic impact of processing industry

US Dollars

	2001-'08	2007-'08
1 Producers	\$6,177,000	\$2,483,000
2 Traders & exporters	(\$3,089,000)	(\$1,242,000)
3 Processing factories	\$2,732,000	\$1,325,000
4 Factory workers	\$5,331,000	\$1,628,000
5 Government	(\$7,051,000)	(\$2,595,000)
6 Local communities	<i>Positive, yet difficult to quantify</i>	
Total	\$4,100,000+	\$1,599,000+
Total excluding losses to government	\$11,151,000+	\$4,194,000+

Note: "+" refers to positive impact on local communities

Note: Figures shown have not been adjusted to take into account inflation or discounting

CONTENTS

Project objectives and executive summary

Industry background and current socio-economic landscape

Technoserve's role in the cashew industry

Cashew value chain

Cashew's role in the livelihoods of the rural poor

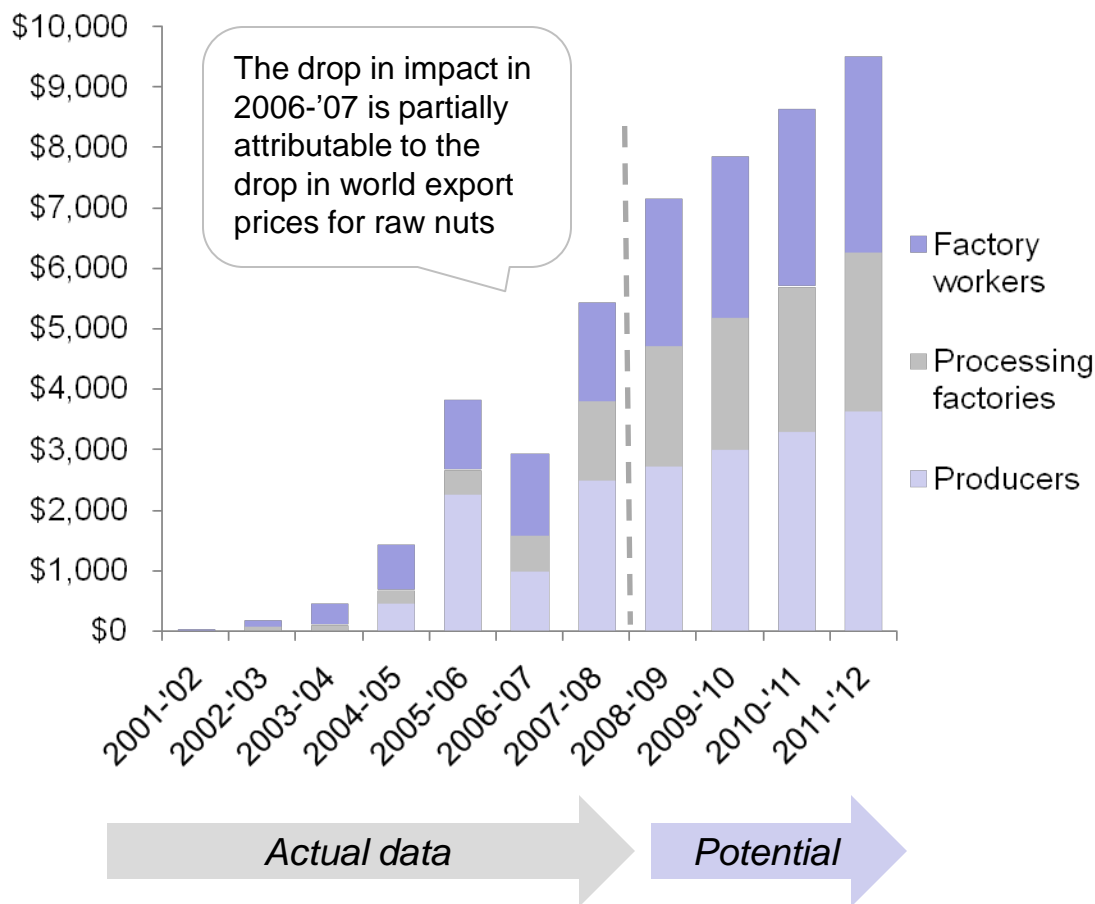
Quantitative economic impact of cashew processing industry

Initiatives to expand industry impact

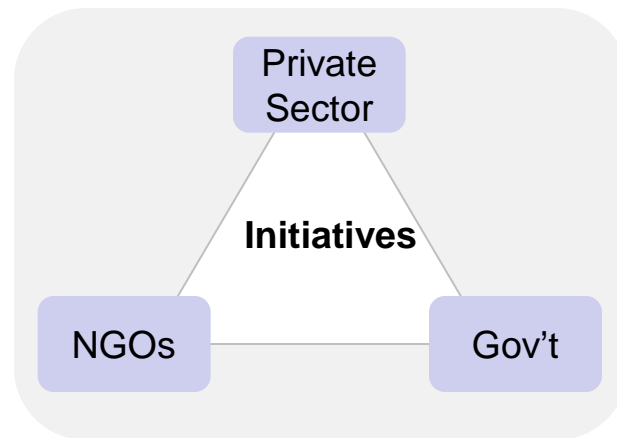
Expanding the impact of the processing industry requires undertaking initiatives that involve government, the private sector and NGOs

Positive economic benefit of processing industry**

US Dollars (000s)



Expanding economic impact



- Opportunities exist to expand the positive impact of the processing industry in coming years
- In order to realize potential, cooperation and coordination is necessary across the private sector government and NGOs

Note: assumes a 10% increase in year-on-year processed quantities from 2009-2012, with a 10% annual increase in benefits to producers

**Note: Losses to government and traders and exporters not shown

Source: Technoserve data for factory workers and processing factories; INCAJU farm gate prices; IPEX export prices; authors calculations

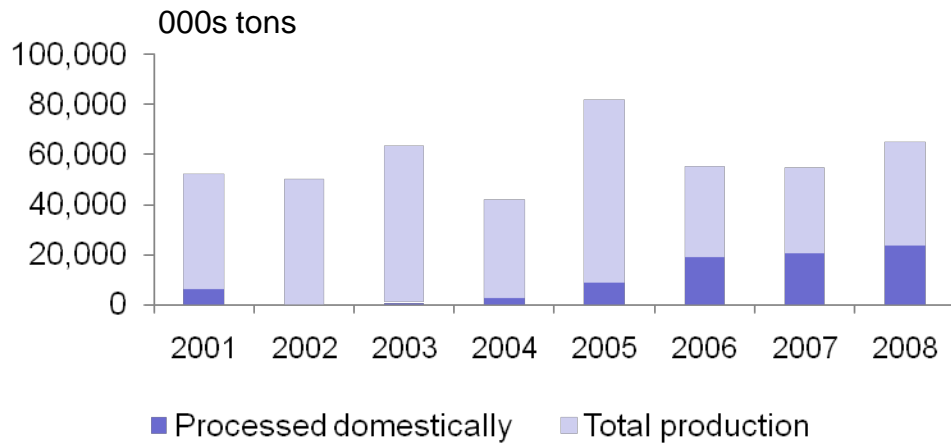
Initiatives to expand industry impact should have clear objectives that aim to benefit targeted stakeholder groups

Initiatives to expand processing industry's impact

Initiative	Objective	Primary beneficiaries
<p>1</p> <p>Cashew replanting programs</p>	<p>Increase quantity and quality of cashew nut production</p>	<p>1 Producers</p> <p>3 Processing Factories</p>
<p>2</p> <p>Expand producer associations</p>	<ul style="list-style-type: none"> • Raise farm gate prices by paying price premium for quality nuts • Leverage economies of scale to increase productivity 	<p>1 Producers</p>
<p>3</p> <p>Raise and market quality standards</p>	<p>Increase sales by marketing comparative advantage in quality standards</p>	<p>3 Processing Factories</p> <p>4 Factory workers</p>
<p>4</p> <p>Explore processing of secondary products</p>	<p>Improve competitiveness and profitability of processing factories</p>	<p>3 Processing Factories</p> <p>4 Factory workers</p>

Replanting will increase total nut production as well as nut quality, conferring positive benefits to producers, factories and workers

Raw nut production in Mozambique



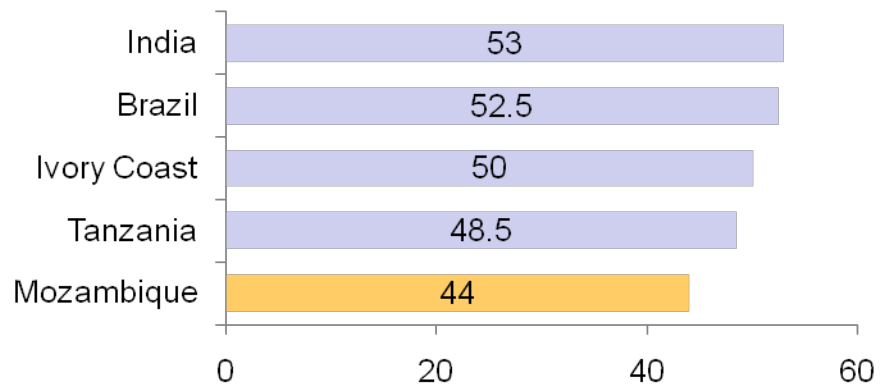
Current Situation

- Total production has been stagnant in recent years due to minimal replanting
- Average nut quality is below international standards, which is primarily attributable to an aging tree population and poor tree maintenance
- Producers, processing factories and factory workers are all negatively impacted by poor nut quality



Average nut quality

Outturn (pounds of sellable kernels per 80 kilos of raw nuts)



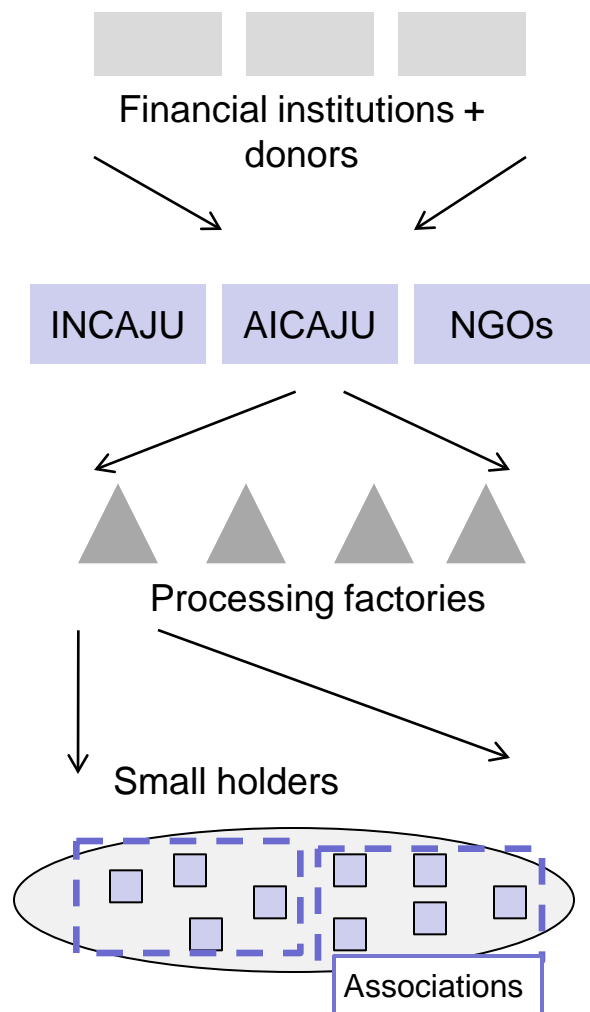
Impact

- Producers income rises from increased production quantity as well as higher prices paid for better nut quality
- Processing factories more profitable due to better availability of raw nuts and improved nut quality
- Factory workers' wages rise as a result of increased productivity caused by improved nut quality

Source: INCAJU; Techonserve; author's calculations on total raw nut production (see appendix for more detail)

Replanting schemes should be lead by the private sector to ensure sustainability, with support from the government and NGOs

Potential cashew replanting program



Funding for project start-up provided by donors and financial institutions

- Program is managed by AICAJU, which is the private sector organization representing the industry.
- INCAJU provides seedlings and technical expertise
- NGO's provide extension services, project management assistance and coordinate with farmers associations

- Replanting sites selected near existing cashew factories or where farmers associations are currently organized and operation
- INCAJU assists with overcoming any barriers involving local or provincial governments

- Local community members plant and maintain trees with support from farmers associations
- Inputs and extension services for intercropping provide by NGOs in order to generate income from first year
- Farmers sell high quality nuts for a "high quality price"
- Project success evaluated on number of trees alive and producing after two years

Expanding coverage of producers groups will increase economic benefits received by cashew producers

Expand coverage of producers groups

	Services	Description	Direct impact
Farmers Associations	Provide agricultural extension services	<ul style="list-style-type: none"> Assistance provided to for planting as well as maintenance of existing trees 	<ul style="list-style-type: none"> Increased output quantity Improved nut quality
	Provide economies of scales in selling raw nuts	<ul style="list-style-type: none"> Cost of inputs decrease due to group purchasing Group selling in sufficient quantities increases sellers' position 	<ul style="list-style-type: none"> Decrease cost of production Gains in farm gate prices
	<i>Provide credit and agricultural inputs (proposed for future implementation)</i>	<ul style="list-style-type: none"> <i>Provide credit to producers to facilitate planting</i> 	<ul style="list-style-type: none"> <i>Decreased barriers to replanting</i>
IKURU	Pay price premium for quality nuts	<ul style="list-style-type: none"> Associations test and monitor nut quality Producers paid a premium for high quality nuts 	<ul style="list-style-type: none"> Increased farm gate prices Create incentives to produce high quality nuts

The overall objective is to create a “culture of quality” in the industry whereas prices for all raw nuts (purchases by raw exporters and domestic processing factories) take into account quality of nuts**

Demand for Mozambican kernels can be increased by marketing the high quality standards within processing factories

Improve and market quality standards**

Current situation – International market

- Rise in wages in Vietnam and India has led to outsourcing of nut processing, with an accompanying decrease in standards of labor practices
- Due in part to the rise in popularity of Fair Trade products, cashew buyers are paying closer attention to the conditions and labor practices employed within cashew factories

Current situation – Mozambique

- Adequate health and safety measures for workers exist within most factories
- Hygiene conditions in newer factories tend to be quite high, but inadequate standards exist in some factories
- A collective agreement has been reached between factory workers and owners that defines the industry-wide compensation plan based on worker productivity
- All Zambique cashews sold through a single wholesales broker, who earns a commission of 3% of the wholesale price

Initiative

- Leverage AICAJU to raise quality standards in all factories in order to meet or exceed international standards
- Undertaking a marketing campaign emphasizing the comparative advantage of Mozambique in quality standards
- Expand sales into multiple new markets and wholesales brokers

Impact

- Mozambican cashews viewed as a market leader in quality and traceability
- Increased overall demand for Mozambican kernels as buyers shift away from Vietnamese and Indian processors
- Reduced commission paid to wholesale brokers, thus increasing profitability
- Improved productivity and reliability of workforce resulting from improved working conditions

**Note: Quality standards include health and safety conditions for workers, compliance with labor standards and hygiene standards

Processing secondary products presents opportunities to increase profitability of processing factories

Opportunity for processing secondary products



Product	Uses	Notes	Potential
Kernel (22% of weight)	<ul style="list-style-type: none"> Process broken kernels into nut butter 	<ul style="list-style-type: none"> Sell broken kernels to local peanut butter factory 	★ ★
Kernel skin (<1% of weight)	<ul style="list-style-type: none"> Paints and varnishes 	<ul style="list-style-type: none"> Little attention as of yet 	★
Raw nut shell (77% of weight)	<ul style="list-style-type: none"> Cashew shell nut liquid (CSNL) used as industrial lubricant Shells burned as fuel 	<ul style="list-style-type: none"> Previous challenges with transport of CSNL, but various trials currently underway Factories recently began burning shells to heat roasters 	★ ★ ★
Cashew apple	<ul style="list-style-type: none"> Human consumption of apple Human consumption of drinks (alcoholic and non-alcoholic) Animal consumption of apple Bio-fuel input** 	<ul style="list-style-type: none"> High potential, yet little commercial production Local market for drinks served by household production Further research needed to explore bio-fuel uses** 	★ ★ ★
Tree branches and bark	<ul style="list-style-type: none"> Chemical industry 	<ul style="list-style-type: none"> Little attention as of yet 	★
Impact	<ul style="list-style-type: none"> Increased profitability of cashew factories Expanded employment for factory workers 		

Estimates of potential increases in value added through secondary processing range between 10% and 100%**

The private sector, government and NGOs should all play specific roles to ensure the successful implementation of initiatives

Roles and responsibilities

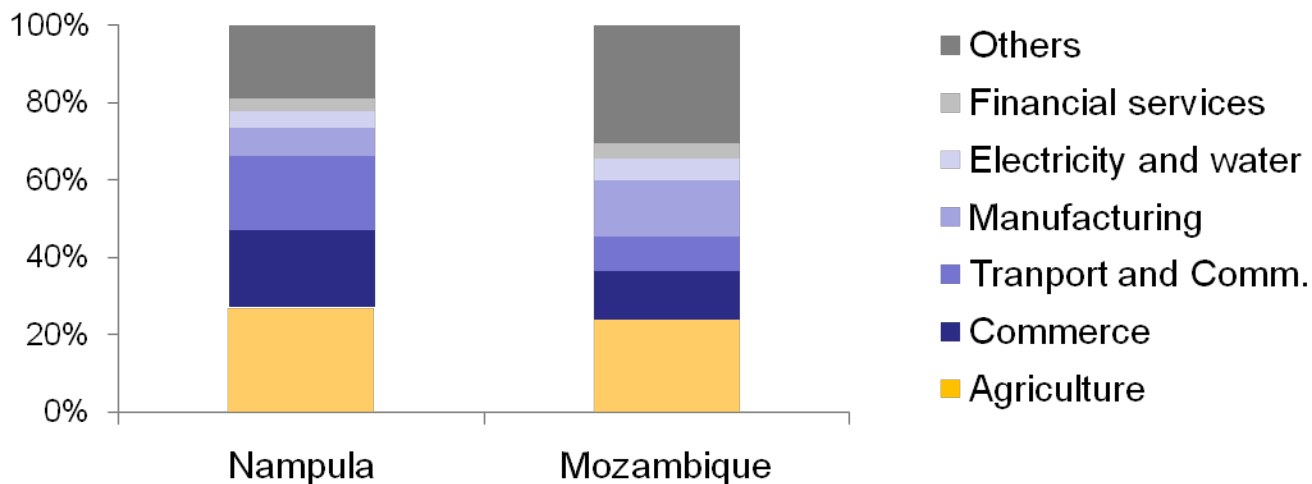
	Private Sector	Government	NGO's
1 Cashew replanting programs	<ul style="list-style-type: none"> • Purchase nuts from producers and pay price premium for quality 	<ul style="list-style-type: none"> • Provide credit for cashew growing schemes • Distribute subsidized inputs • Research to improve practices 	<ul style="list-style-type: none"> • Raise funding for planting programs • Provide extension services to producers
2 Expand producer groups	<ul style="list-style-type: none"> • Expand relationships with producer groups • Provide extension services on an ongoing basis (IKURU) 	<ul style="list-style-type: none"> • Ensure legal registration framework grants favorable legal status to associations • Ensure legal environment conducive to creating and enforcing purchasing contracts 	<ul style="list-style-type: none"> • Provide preliminary organizational support and extension services • Share learnings and best practices
3 Raise and market quality standards	<ul style="list-style-type: none"> • Implement quality standards across factories • Develop and implement marketing plan 	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • Provide assistance in drafting and implementing marketing plan
4 Explore processing of secondary products	<ul style="list-style-type: none"> • Undertake pilot programs focused on secondary processing • Share learnings and best practices 	<ul style="list-style-type: none"> • Undertake research into processing techniques and uses of secondary products 	<ul style="list-style-type: none"> • Conduct feasibility studies and help with strategic planning • Provide technical expertise as necessary

Appendix

Nampula's economy is dependent upon agricultural production, which is the largest single sector of the economy

GDP sector

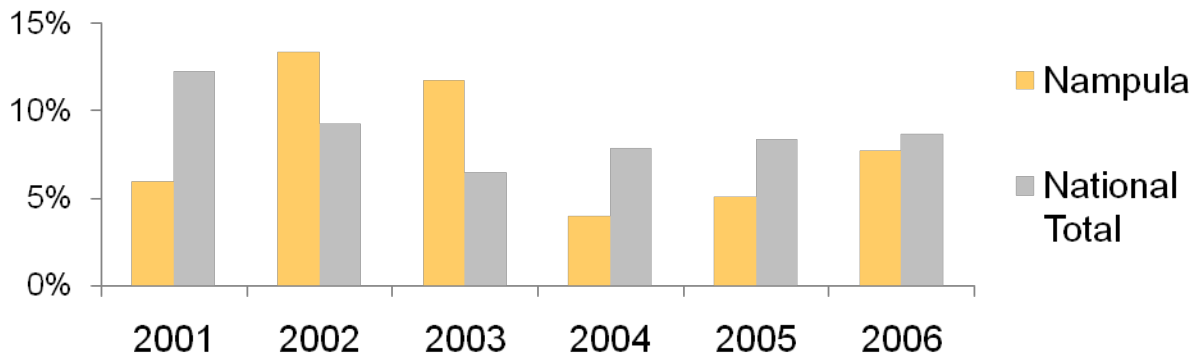
Percentage, 2006



Agriculture may be understated here due to the fact that commerce and transportation play a role in bringing agricultural products to markets

GDP growth rates

Percentage (real terms), 2006

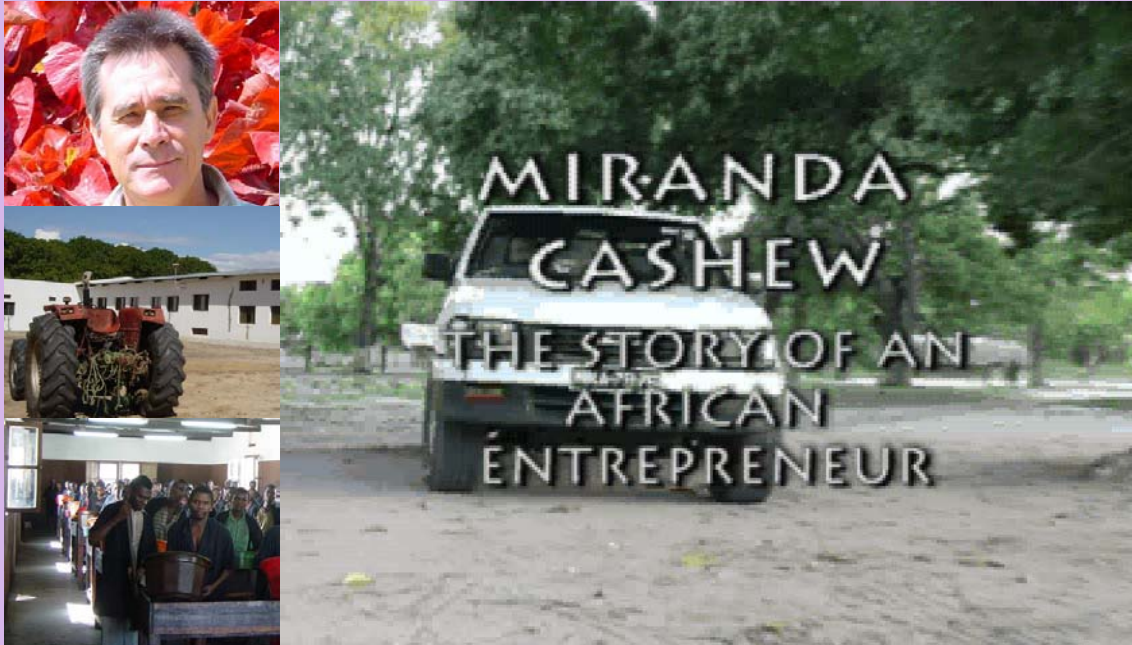


Compound Annual Growth Rate ('00 - '06)

Nampula= 7.9%
Nation= 8.8%

In 2001, Technoserve assisted Antonio Miranda to launch the first successful smaller scale cashew processor in Mozambique

Antonio Miranda, Miranda Industrias



- In 2001, Antonio Miranda, a Mozambican entrepreneur, piloted a small-scale, manual, rurally located processing plant
- In 2004, he opened a second 1,000-ton factory – with revenues over \$1 million

Technoserve helped by:

- Assessing global performance benchmarks and developing initial business plan
- Providing world class advice focusing on processing productivity and quality
- Creating links to producers and supporting raw nut quality improvement
- Creating links to export markets
- Assisting in raising investment and working capital
- Identifying additional entrepreneurs

Technoserve began its involvement by identifying an opportunity for smaller scale cashew processing in Mozambique

Summary of Technoserve industry assessment, circa 2000

Excellent future prospects for cashew nuts

Comments

- High US per capita consumption (250g per person per year) – strong catch-up potential for other markets, both EU, Asia and emerging economies
- Relative health benefits of cashew nuts currently undermarketed (e.g. cashew nuts are not fattening, and do not contain cholesterol)

Mozambique has strong potential...

- Mozambican climate is excellent for cashew growing, as evidenced by the fact that 30 years ago, Mozambique was the leading producer
- High availability of low cost labor

...if approached in the right way

- The failures of the last 30 years can be ascribed to a combination of civil war, Marxism and inappropriate industrial policy (focus on large scale, expensive, but ineffective processing plants, lack of farmer incentives)
- Current, liberalised, industrial and economic policy leaves the field clear for new players
- Suggested approach is to use smaller scale processing plants, with technology and management appropriate to local conditions

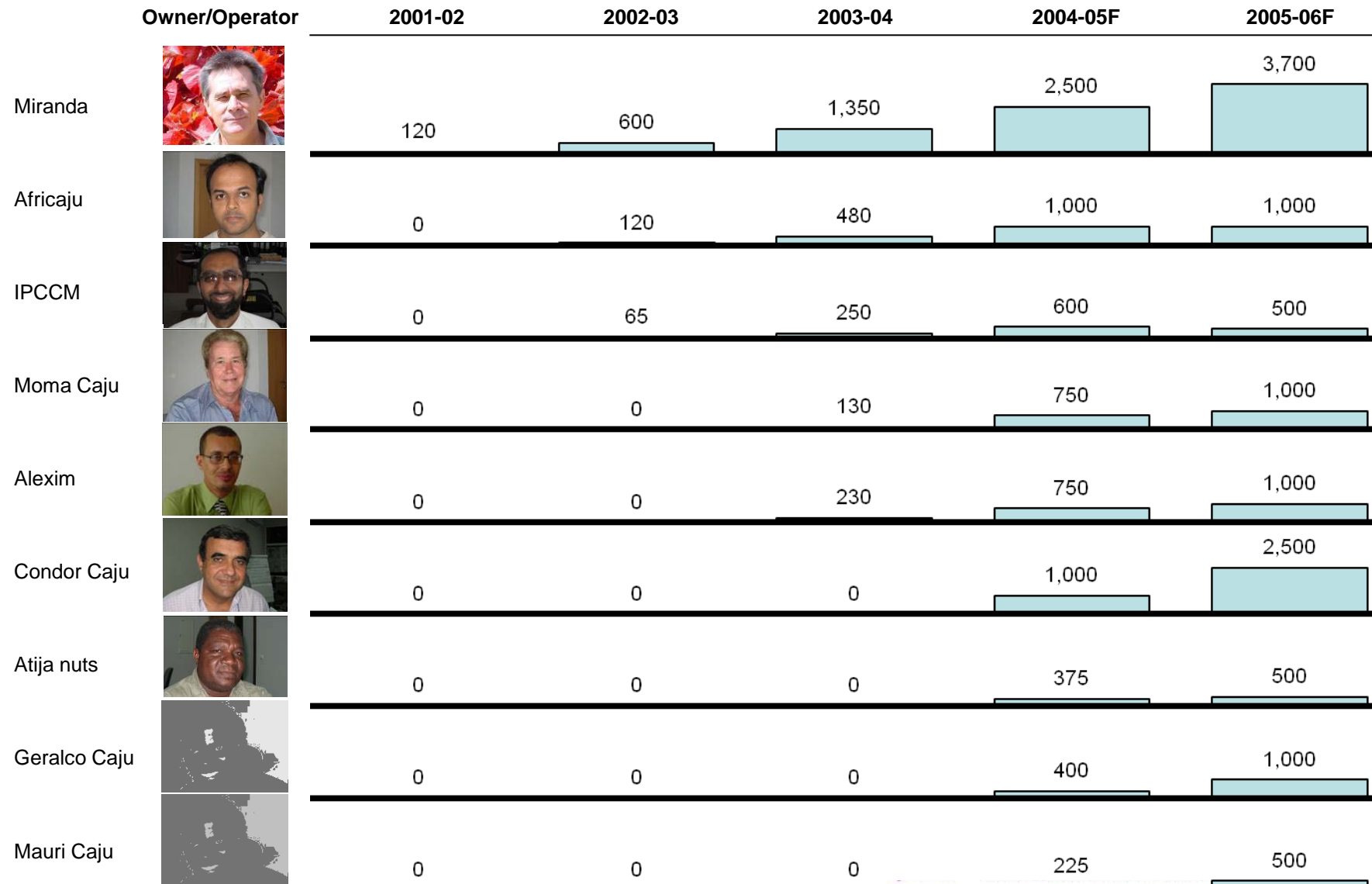
Technoserve then developed a small scale processing approach appropriate to the Mozambican environment

Benefits of small scale processing approach developed by Technoserve

Success factor	Description	Advantage of Technoserve process
<div style="border: 1px solid black; padding: 5px;">1. Competitive sourcing of quality raw nuts</div> ✓	<ul style="list-style-type: none"> The nuts should be supplied at the lowest possible price (including transport costs, delays) The nuts should be of the best possible quality 	<ul style="list-style-type: none"> Rural placing allows for shorter transport distances, and cuts out middlemen, making purchasing more competitive No evidence that large plants are sourcing raw nuts at lower prices than smaller plants
<div style="border: 1px solid black; padding: 5px;">2. Low operating cost</div> ✓	<ul style="list-style-type: none"> Operating costs per kg. of processed nut should be as low as possible This is a function both of level of salaries, and efficiency of workers 	<ul style="list-style-type: none"> Low cost compared to mechanical shelling <ul style="list-style-type: none"> Effective manual shelling method Low labour cost in rural areas Well-managed operation
<div style="border: 1px solid black; padding: 5px;">3. Low capital cost</div> ✓	<ul style="list-style-type: none"> Capital costs per kg. of processed nut should be as low as possible This is a function both of level of investment, capital efficiency and capacity utilisation 	<ul style="list-style-type: none"> On a capacity-adjusted basis, Capital costs are only 25% of those of a large scale mechanical plant Additionally, the smaller scale plants are much more likely to achieve 100% utilisation
<div style="border: 1px solid black; padding: 5px;">4. High output quality</div> ✓	<ul style="list-style-type: none"> Profits are highly dependent on average sales prices, which are again critically reliant on the proportion of valuable whole nuts in the finished product 	<ul style="list-style-type: none"> Manual shelling has superior quality to mechanical shelling, if workers are properly trained and incentivised

Following the success of Miranda, Technoserve assisted multiple cashew entrepreneur start ups

Raw nuts processed by Technoserve assisted clients, tons



With the aim of sustainable growth, Agro Industrias Asociadas (AIA) was established with Technoserve assistance as an export services provider

AIA owners—major Nampula processors

Miranda



Africaju



IPCCM



Moma Caju



Alexim



Condor Caju



Atija nuts

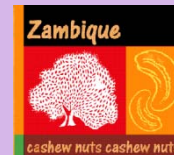


- Equal ownership
- Contribution of \$500 startup capital each in 2004 →

Agro Industrias Asociadas (AIA)

AIA design

- Private service company (not an association) formed in 2004 by the major cashew processors in Nampula
- Services charged on a user pays basis
- Currently 12 employees
 - 1 full time professional export manager
 - Remainder warehouse and admin staff
- Owner of Zambique brand



Services Provided

Processing

- Importing non-nut inputs (packaging and machinery)

Distribution

- Warehousing and load consolidation at Nacala port
- Nacala warehouse to port transport
- Export administration (paperwork)

Marketing

- Selling—order filling with buyer
- Quality checking before shipping

↑ Services provided free of charge



TECHNO SERVE
Business Solutions to Rural Poverty

- Start up advice
- Ongoing assistance to export manager
- Quality control advisor

Government revenue calculations

Tax revenue earned from cashew factories

All figures in USD 000s

	2001-'02	2002-'03	2003-'04	2004-'05	2005-'06	2006-'07	2007-'08
Cost of consumables and packaging	\$3	\$21	\$75	\$267	\$605	\$701	\$800
VAT from consumables and packaging (17%)	\$0.4	\$3	\$11	\$39	\$88	\$102	\$116
Factory profits	\$11	\$73	\$97	\$226	\$418	\$583	\$1,325
Taxes from factory profits (32%)	\$3	\$23	\$31	\$72	\$134	\$187	\$424

Foregone tax revenues lost from domestic processing

	2001-'02	2002-'03	2003-'04	2004-'05	2005-'06	2006-'07	2007-'08
Domestic Processed raw nuts (tons 000s)	120	785	2,635	8,632	19,190	20,750	23,700
FOB export price (USD per ton)	\$374	\$393	\$457	\$683	\$556	\$506	\$735
Export tax rate	18%	18%	18%	18%	18%	18%	18%
Foregone tax revenues (USD 000s)	\$8	\$55	\$217	\$1,061	\$1,919	\$1,889	\$3,135

Total raw nut production calculations

Total raw nut production in Mozambique

Tons

	2001-'02	2002-'03	2003-'04	2004-'05	2005-'06	2006-'07	2007-'08
Exports*	25,592	36,289	20,217	63,346	26,349	24,176	31,607
Domestic processing**	120	785	2,635	8,632	19,190	20,750	23,700
Other***	24,465	26,744	19,433	10,000	10,000	10,000	10,000
Total	50,177	63,818	42,285	81,978	55,539	54,926	65,307

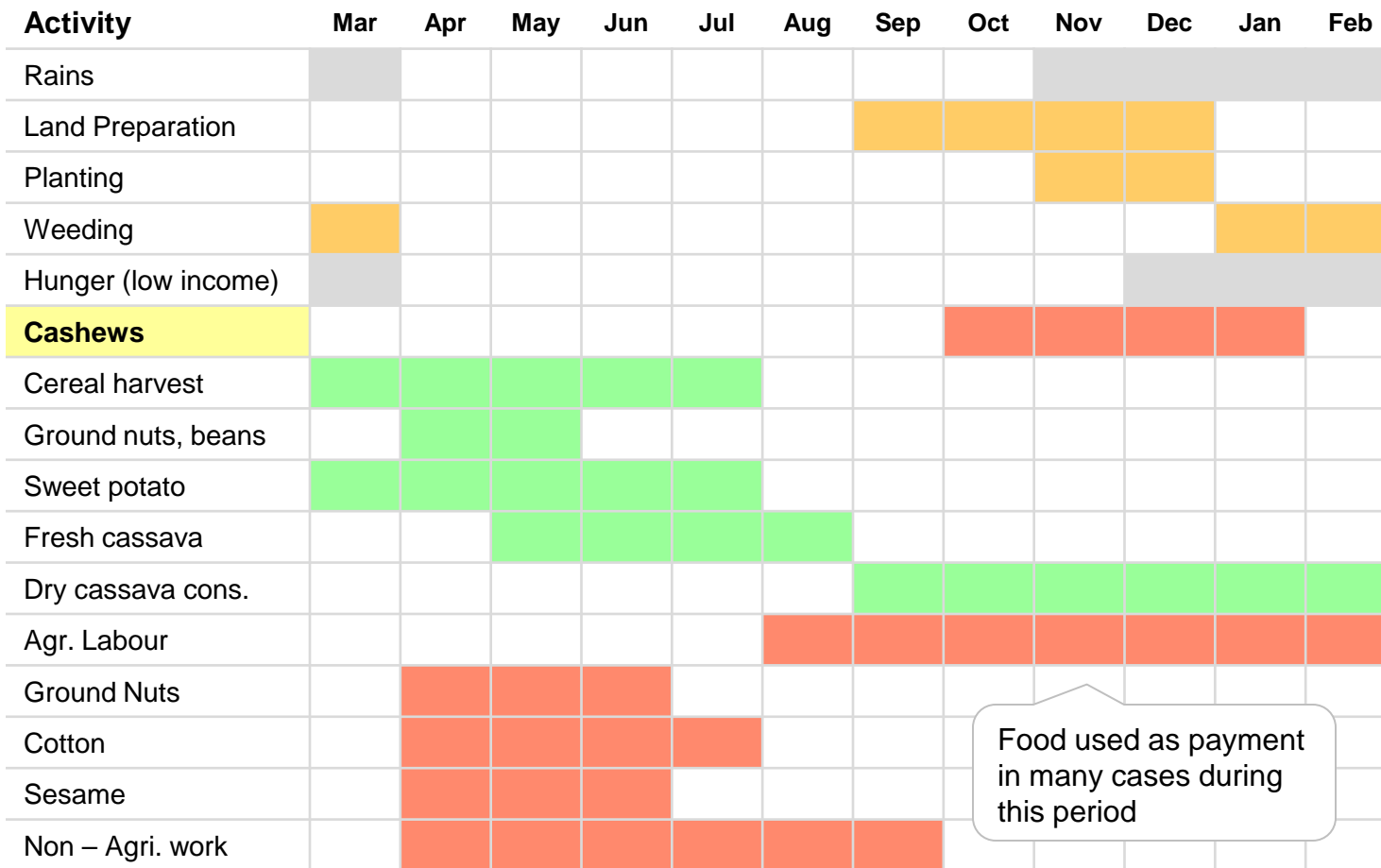
*Source: INCAJU

** Source: Technoserve

***Source: INCAJU from 2001 -'04, then author's approximations for 2004-'08

Lifestyles and livelihoods of rural farmers are dictated by the agricultural calendar

Planting schedule, crop consumption and income sources



=Agriculture work
 =Crop consumption
 =Income
 =Other

Cashews harvesting is counter cyclical to most other crops, making it a good compliment in terms of workload and income

Nearly all farmers produce a variety of crops, however they typical sell a small portion of them and keep the rest for household consumption

Low availability of food sources leads some poorer cashew farmers to sell earlier in the season at decreased prices

Food used as payment in many cases during this period