

Let's Work: Value Chain Based Job Creation

Study Design Report

Volume 1: Product Selection and Background

Prepared for

More & Better Jobs in Mozambique

Prepared by



Global Development Solutions, LLC

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*Let's Work: Value Chain Based Job Creation
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1. Context and Purpose

Mozambique is faced with both a jobs and skilled labor shortage. Mozambique's current job landscape is largely informal, unskilled, low value-added and dominated by agriculture and small firms. Though GDP has grown an impressive 7.2% per annum 2011-2015,¹ the quantity and quality of job creation locally has failed to keep pace with demand. Of a total population of 25.8 million,² Mozambique's labor force constitutes approximately 11.6 million workers.³ Current unemployment nationally is estimated at 22.6% (19.8% for males and 25.0% for females),⁴ and an estimated 300,000 youth will enter the labor force each year. Mozambique's adult population averages only 1.2 years of formal education, with only 20% of the workforce having completed primary school and only 13% completing secondary school.⁵ The low skills level of the labor force creates challenges for employers, who are unable to hire or train qualified laborers, as well as for business development in general, as low skills stifle a culture of entrepreneurship. Given that the primary sector constitutes 83.5% of employment, the secondary sector 3.8% and the tertiary sector 12.7%, the overall low skills profile of the economy also contributes to a low level of economic transformation and limited skills growth path.^{6,7} Further, the informal economy is estimated to absorb 68%⁸ to 95% of the total labor force,⁹ with higher levels of informal participation and marginal jobs in rural areas,¹⁰ posing challenges for measuring employment.

To help address the jobs and skills shortage in Mozambique, and working closely with the Let's Work Program (LWP), a global partnership that prioritizes sector-specific formal job creation and productivity improvement, Global Development Solutions, LLC (GDS) explored sub-sector potential within the key sectors of agriculture, forestry and construction. As an initial pilot of the LWP, for each key sector, Government of Mozambique (GoM) and The World Bank Group (WBG) will select one sub-sector and associated product as proxies for GDS to examine in depth regarding opportunities and challenges for growth and jobs expansion. To maximize job creation potential, the target growth and assessment includes direct jobs as well as indirect and induced job effects in the value chain.

¹ World Bank

² World Bank (2013 data).

³ Mozambique Labour Market Profile 2014, Danish Trade Union Council for International Development Cooperation.

⁴ World Bank Group World Development Indicators (ILO estimate)

⁵ Mozambique, African Economic Outlook 2012, www.africaneconomicoutlook.org, AfDB, OECD, UNDP, UNECA

⁶ World Development Report 2013 on Jobs, Statistical Tables (data as of 2010).

⁷ The primary sector involves the extraction of raw materials and production of basic foods (e.g., coal, wood, iron, maize). The secondary sector involves the transformation of raw materials into goods (e.g., wood into furniture, steel into cars, cotton to clothing). The tertiary sector involves supplying services to consumers and business (e.g., retail, sales, transportation, restaurants). The Modern Economy: Primary, Secondary & Tertiary Sectors, Study.com.

⁸ Mozambique, African Economic Outlook 2012, www.africaneconomicoutlook.org, AfDB, OECD, UNDP, UNECA

⁹ Friederich Ebert Stiftung, as cited in Mozambique Labour Market Profile 2014, Danish Trade Union Council for International Development Cooperation.

¹⁰ Mozambique, African Economic Outlook 2012, www.africaneconomicoutlook.org, AfDB, OECD, UNDP, UNECA

2. National Employment Profile

Mozambique's current job landscape is largely informal, unskilled, low value-added and dominated by agriculture and small firms. Of a total population 25.8 million,¹¹ Mozambique's labor force constitutes approximately 11.6 million workers.¹² The informal economy is estimated to absorb 68%¹³ to 95% of the total labor force,¹⁴ with higher levels of informal participation in rural areas, including subsistence farming.¹⁵ By work status, Mozambique employment is 82.5% farming, 8.9% wage employment and 8.6% non-farm self-employment.¹⁶ National unemployment is reported as 22.6% (19.8% for men and 25.0% for women).¹⁷ Given the high population growth rate (2.8%), an estimated 300,000 youth enter the labor force each year, for whom unemployment is estimated at 40.7%.¹⁸

Mozambique Employment Snapshot

- Large informal economy: est. 68% to 95% of total employment
- Reliance on agriculture: 70% to 80% of labor force, including subsistence farming and forestry
- Only 2% of employment in construction
- Low skills and education levels: average 1.2 years of formal education
- Many small firms: 78% of firms have 5 or less workers
- Little transformation or value addition: 83.5% of employment in primary versus secondary or tertiary sectors

Small firms dominate the landscape. A non-agricultural enterprise census revealed that the median firm in Mozambique has only two workers, while 78% of firms have up to only five workers.¹⁹ The economy currently exhibits little transformation or value addition, with the primary sector constituting 83.5% of employment, the secondary sector 3.8% and the tertiary sector 12.7%.^{20,21}

Agriculture, including forestry, is by far the single largest employment sector in Mozambique. Various studies provide differing estimates of agriculture's employment contribution, for

¹¹ World Bank (2013 data).

¹² Mozambique Labour Market Profile 2014, Danish Trade Union Council for International Development Cooperation.

¹³ Mozambique, African Economic Outlook 2012, www.africaneconomicoutlook.org, AfDB, OECD, UNDP, UNECA

¹⁴ Friederich Ebert Stiftung, as cited in Mozambique Labour Market Profile 2014, Danish Trade Union Council for International Development Cooperation.

¹⁵ Mozambique, African Economic Outlook 2012, www.africaneconomicoutlook.org, AfDB, OECD, UNDP, UNECA

¹⁶ World Development Report 2013 on Jobs, Statistical Tables (data as of 2010).

¹⁷ World Bank Group World Development Indicators (ILO estimate), 2011-2015 data.

¹⁸ Youth total unemployment (percent of total labor force ages 15-24) (modeled ILO estimate), International Labour Organization, Key Indicators of the Labour Market database, 2011-2015 data.

¹⁹ World Bank Development Report, Jobs, World Bank, 2013, p. 191, as cited in Mozambique Labour Market Profile 2014, Danish Trade Union Council for International Development Cooperation.

²⁰ World Development Report 2013 on Jobs, Statistical Tables (data as of 2010).

²¹ The primary sector involves the extraction of raw materials and production of basic foods (e.g., coal, wood, iron, maize). The secondary sector involves the transformation of raw materials into goods (e.g., wood into furniture, steel into cars, cotton to clothing). The tertiary sector involves supplying services to consumers and business (e.g., retail, sales, transportation, restaurants). The Modern Economy: Primary, Secondary & Tertiary Sectors, Study.com.

example an estimated 81% of the labor force and 33% of GDP²² versus 70% of the labor force and 24% of GNP.²³ In contrast, the construction sector is estimated to employ 2.1% and contribute 3.7% of GDP, while manufacturing employs less than 1% but contributes 12% to GDP (Table 1). Within agriculture, women contribute highly to the labor force (61% of employment), while for other sectors, female participation is less prevalent (3% to 40%).

Table 1: Sector Employment and Contribution to GDP

Sector	Employment			GDP
	Employment share per sector	Percent male	Percent female	GDP share per sector
Mining and quarrying	0.5%	89.0%	11.0%	2.4%
Manufacturing	0.8%	90.8%	9.2%	12.0%
Electricity, gas and water	0.0%	NA	NA	4.1%
Construction	2.1%	97.0%	3.0%	3.7%
Trade, restaurants and hotels	7.0%	59.6%	40.4%	17.0%
Transport and communication	1.0%	96.1%	3.9%	9.8%
Finance, real estate and business services	5.0%	66.6%	33.4%	6.3%
Public administration, education and health	3.1%	76.0%	24.0%	4.5%
Other services	NA	NA	NA	8.2%
Agriculture, forestry, fishing and hunting	80.5%	39.2%	60.8%	33.0%

Percent totals may not sum due to rounding by source.

Source: Employment: ILO, *Key Indicators of the Labour Market Database* (2003 data); GDP: Country Notes, Mozambique, *AfricanEconomicOutlook.org*, 2014 (2012 data), as cited in: *Mozambique Labour Market Profile 2014*, Danish Trade Union Council for International Development Cooperation.

Mozambique's adult population is estimated to have on average 1.2 years of formal education, reportedly the lowest education level among adult population in the world.²⁴ Only 20% of the workforce has completed upper primary school, and only 13% completed secondary school.²⁵ The low skills level of the labor force creates challenges for employers, who are unable to hire or train qualified laborers, as well as for business development in general, as low skills fail to promote a culture of entrepreneurship. To discourage foreign companies from importing labor to fill key positions, GoM has promoted the "Mozambication" of new projects, with established quotas for foreign workers, typically 5% to 10%, depending on project or enterprise size.²⁶ The national Vocational Training Institute (IEFP) turns out 156,000 graduates per year and since 2006 has had in place an Integrated Program for Professional Education (PIREP) with the support of WBG and other donors. Still, with continued and evolving labor market demands,

²² Mozambique Labour Market Profile 2014, Danish Trade Union Council for International Development Cooperation

²³ Anuário de Estatísticas Agrárias 2012-2014, Ministério da Agricultura e Segurança Alimentar (MASA), República de Moçambique.

²⁴ Mozambique, African Economic Outlook 2012, www.africaneconomicoutlook.org, AfDB, OECD, UNDP, UNECA

²⁵ Mozambique, African Economic Outlook 2012, www.africaneconomicoutlook.org, AfDB, OECD, UNDP, UNECA

²⁶ Mozambique, African Economic Outlook 2012, www.africaneconomicoutlook.org, AfDB, OECD, UNDP, UNECA

particularly for the oil and gas sector in recent years, there are calls for IEF to increase its output and update the training course curricula.²⁷

3. Introduction

In support of the Let's Work Partnership in Mozambique, Global Development Solutions (GDS) explored product potential for products in the key sectors of agriculture, forestry and construction **(Error! Reference source not found.)** and examined sector background, donor support programs, potential anchor firms, market demand and direct and indirect employment linkages for the shortlisted products, in order to help guide product selection.

Table 2: Product Shortlist for Consideration

Sector	Potential products
Agriculture	Cashew Cassava Pigeon pea Soybean Sugarcane
Forestry	Plantation Value-added secondary products
Construction	Housing construction Construction material

Source: Global Development Solutions, LLC, in consultation with World Bank

4. Agriculture

Mozambique's agricultural sector is characterized mainly by subsistence farming, with commercial lands focusing mainly on sugar, tobacco, cotton and cashew nuts. Agricultural exports reached USD700 million in 2014, while agricultural imports were around USD1 billion.²⁸ Mozambique's total land area covers 79 million hectares (ha) with a potential agricultural area of 49 million ha or 62% of total land area. Arable land area currently covers only 5.8 million ha or 7% of total land area. Over 80% of the total cultivated area is used for the production of staple food crops for self-consumption. Each household cultivates an average of 1.2 ha with no formal land title deeds. Farming involves the whole family, but with women as the head of agricultural production. The use of tractors, ploughs, fertilizers and pesticides is limited. Hence, productivity per hectare is low, but the potential for agricultural growth is significant. Agricultural output increased by 50% in the past 10 years driven by private sector investment.

Potential products shortlisted for the agriculture sector include the following: cashew, cassava, pigeon pea, soybean and sugarcane. A brief sector profile for each follows below, with additional detail provided in subsequent sections.

²⁷ Ibid

²⁸ Mozambique Agricultural Economic Fact Sheet, 27 Aug 2015, http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Agricultural%20Economic%20Fact%20Sheet_Pretoria_Mozambique_8-27-2015.pdf

Table 3: Sector Profile: Cashew

Key Factors	Profile
Production area	<ul style="list-style-type: none"> • Cabo Delgado, Nampula, Zambezia, Inhambane, Gaza and Maputo • 37% of trees located in Nampula
Processing facilities	<ul style="list-style-type: none"> • Nampula, Zambezia, Gaza, Inhambane
Processing technology	<ul style="list-style-type: none"> • Manual shelling with hammer, semi-mechanical cutting, mechanical cutting, impact shelling (labor intensive)
Employment opportunities	<ul style="list-style-type: none"> • High for smallholder farmers in rural areas, particularly for women • Sector currently employs 9,000 workers
Primary markets	<ul style="list-style-type: none"> • India (raw); USA, EU, South Africa, Saudi Arabia, Lebanon (processed)
Exports	<ul style="list-style-type: none"> • USD70 million (2010) • Major producers of cashew nuts south of the equator with early harvest (Oct-Dec)
Policy	<ul style="list-style-type: none"> • 18% tax on FOB value to protect raw nut exports
Standards	<ul style="list-style-type: none"> • Complies with international standard

Source: Compiled by Global Development Solutions, LLC

Table 4: Sector Profile: Cassava

Key Factors	Profile
Product relevance	<ul style="list-style-type: none"> • Northern farmers sell 13% of their cassava production • 70% of production for human consumption • Staple food for more than 50% of population in northern area
Production area	<ul style="list-style-type: none"> • Throughout entire country • Primarily smallholder production
Marketing	<ul style="list-style-type: none"> • Mostly for domestic sales
Supply chain	<ul style="list-style-type: none"> • Disconnect between rural production and industry
Processing	<ul style="list-style-type: none"> • Recent activity producing cassava-based beer; Cervejas de Moçambique produces cassava beer in Nampula province • Cassava-based ethanol production is in the experimental phase in the central region

Source: Compiled by Global Development Solutions, LLC

Table 5: Sector Profile: Pigeon Pea

Key Factors	Profile
Product relevance	<ul style="list-style-type: none"> • 5th largest producer and 3rd largest exporter in the world • Fastest growing crop in Mozambique (annual growth rate of 8% since 2002)
Production	<ul style="list-style-type: none"> • Produced mainly by smallholders (over 1 million households in Mozambique) • Large scale intensive growth difficult, making it suitable for smallholder production • Zambezia produces almost all of Mozambique's pigeon pea (190,000 ha country-wide) • Southern region unsuitable for pigeon pea due to low rainfall
Consumption	<ul style="list-style-type: none"> • Little to no domestic consumption
Processing	<ul style="list-style-type: none"> • Mainly in Zambezia, Nampula, Sofala
Exports	<ul style="list-style-type: none"> • India, world's largest importer and consumer of pigeon pea, absorbs all of Mozambique's production • Exports whole (not split) pigeon pea due to the small price premium from processing

Source: Compiled by Global Development Solutions, LLC

Table 6: Sector Profile: Soybeans

Key Factors	Profile
Production	<ul style="list-style-type: none"> • Commercial production new to Mozambique • Numerous donor support programs • Less than 50 farmers producing currently • 15,000 ha under cultivation
Demand	<ul style="list-style-type: none"> • 90,000 tons (2015)
Export	<ul style="list-style-type: none"> • Strong local, regional and global demand
Key constraints	<ul style="list-style-type: none"> • Technical skills required for production • Non-availability of improved seed varieties • Limited use of fertilizers • Lack of organized seed production and delivery system • Frequent drought • Weak supply chain linkage between producer, processor and consumer

Source: Compiled by Global Development Solutions, LLC

Table 7: Sector Profile: Sugarcane

Key Factors	Profile
Production	<ul style="list-style-type: none"> • 67% produced in large estates around Maputo, 25% in Sofala, 8% in Gaza • Production area defined by availability of irrigation and transport network • Approximately 40,000 ha under cultivation • Local production reached 172,073 (2010/11)
Employment	<ul style="list-style-type: none"> • 29,922 permanent and temporary workers (2010)
Processing	<ul style="list-style-type: none"> • Limited; price differential between raw and refined sugar only USD13/ton
Consumption	<ul style="list-style-type: none"> • 70% of households consumer brown unrefined sugar
Export	<ul style="list-style-type: none"> • Raw form rather than refined sugar • Along with cashew, sugar is a main export product
Key challenges	<ul style="list-style-type: none"> • Insufficient credit making it inaccessible for smallholder farmers • Weak cane growers' association • Poor extension service and agricultural input service • Lack of transparency in farmer payment system

Source: Compiled by Global Development Solutions, LLC

4.1. Sector Background in Mozambique

Production characteristics of the shortlisted products in Mozambique are explored in the table below. Among the shortlisted products, cassava is the most important crop in terms of production volume and value, and number of farmers engaged in production. Sugarcane also has significant production volume, though limited production value (USD15/ton).²⁹ Cashew, cassava and pigeon pea involve the highest number of farmers (at least 1,000,000 participants each, indicating a high level of smallholder participation). Relative to the other products, soybean has limited current production and participants, though has the highest expected growth rate through 2020 (15%), fairly high production value per farmer (USD594) and above average unit value (USD389/ton). The cassava and sugarcane industries are expected to growth only 2% annually through 2020. In examining farm efficiency, sugarcane has the highest production quantity per farmer (109 tons), while both cassava and sugarcane net the highest production value per farmer (USD1,665 and 1,657, respectively). The average production value by farmer for both cashew and pigeon pea is only USD22 per farmer. Figures reflect national data for Mozambique; regional data specific to the target areas in northern Mozambique were not available.

²⁹ Unless otherwise indicated, all references to tons in this report are metric tons.

Table 8: National Production, Employment and Expected Growth for Shortlisted Agriculture Products

Product	Current production (000 tons in 2013)	Production value (USD million)	Estimated number of farmers (000)	Production quantity (tons) per farmer	Production value (USD) per farmer	Implied unit value (USD/ton)	Expected growth (CAGR 2015-2020)
Cashew	65	30	1,372	0.05	22	461.54	7%
Cassava	10,000	4,173	2,507	3.99	1,665	417.30	2%
Pigeon pea	115	22	1,000	0.12	22	191.30	8%
Soybean	49	19	32	1.53	594	387.76	15%
Sugarcane	3,800	58	35*	108.57	1,657	15.26	2%

* number of farmers is number in the sugar industry per Ministry of Agriculture

CAGR = compound average growth rate

Source: FAO (2013); INE National Census of Agriculture (2010); FAO (2014); Climate change and fisheries in Southern and Eastern Africa (2014); Walker et al., Pigeon pea in Mozambique - An emerging success story; as cited in Pilot in Mozambique on Small-Scale Entrepreneurship in Value Chains (DRAFT), Technoserve, 6 Nov 2015.

Details regarding Mozambique's production practices and environment for the considered agriculture products are noted below.

Table 9: Production Notes for Mozambique Production of Shortlisted Agriculture Products

Product	Notes
Cashew	<ul style="list-style-type: none"> Cashew and sugar are two of the main food product exports of Mozambique. Mozambique is one of the major producers of cashew nuts south of the equator. Nuts are marketed in October-December, when the rest of the world is not yet harvesting, which allows its producers to sell both raw and processed nuts at favorable prices.³⁰ Mozambique exports both raw and processed nuts. The main market for raw cashew nuts is India, followed by Vietnam and Singapore. As of 2012, all raw cashew exports went to India. The main export destinations for processed cashew nuts are USA, EU, South Africa and, more recently, Saudi Arabia and Lebanon.³¹ Mozambique exports 10 of the 27 internationally recognized cashew varieties. Exports are mainly of type W320, which is a white nut that is not used for final consumption but is instead a raw material for the international food processing industry.³² As of 2012, total annual exports of cashew nuts, both raw and processed, were valued at US\$70 million.³³ In Mozambique, cashew nuts can be produced along the entire coastal area, which extends around 2,000 km, stretching inland approximately 200 km. The coastal zone of the provinces Cabo Delgado, Nampula, Zambezia, Inhambane, Gaza and Maputo are the most important areas of production. There are approximately 26 million cashew trees nationwide. About 37% of the cashew trees are located in Nampula Province in the North, where 40% of the total production is marketed. The other three important provinces are Gaza and Inhambane in the South and Zambezia in the center. Cashew has facilitated a growing processing industry that generates employment, particularly in the provinces of Nampula and Zambézia in the North, and Gaza and Inhambane in the South. Because of the simplicity of some operations, cashew

³⁰ John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

³¹ Ibid.

³² Ibid.

³³ Ibid.

Product	Notes
	<p>processing can be done by unskilled people and, in certain areas where better skills are needed, reportedly women generally perform better than men. Women are important actors in all areas of the cashew sector (production, processing and commercialization).</p> <ul style="list-style-type: none"> Processing units in Mozambique use mainly four types of technologies to decorticate and extract the oil (CNSL) from the shell. These include manual shelling with hammer, semi-mechanical cutting, mechanical cutting and impact shelling. The final stages in all these processes are labor intensive, and do not vary much from factory to factory. Cashew provides cash income to smallholder farm households that mainly produce subsistence crops (maize). The recently revived local processing industry constitutes a significant source of employment and income, both for men and women, in the rural areas. There is presently a tax (18% on FOB value) on the export of raw nuts, which is intended to protect domestic processors. However, despite the export tax on raw nuts, the existing processing industry has been unable to operate profitably, largely because it was created within a fundamentally different economic context where it was highly subsidized, had a conscripted work force and paid controlled producer prices. Mozambican cashew processing factories employ about 9,000 workers, and the Cashew Industry Association (AICAJU) expects the number to rise to about 12,000. Mozambique's cashew industry follows international standards in labor and environmental sustainability, which provide the foundation for its linkages with premium exports markets, including United States and Europe.
Cassava	<ul style="list-style-type: none"> Cassava (<i>Manihot esculenta</i> Crantz) is one of the main crops in Mozambique. It is the second most important food crop in Mozambique after maize and is the most important root crop. Cassava is the second most widespread crop among households. As a result, it is of major importance for Mozambique from both an economic and social point of view. Farmers in the northern region (surplus areas) produce cassava mostly for self-consumption and the remaining part is sold in the local market. Reportedly, northern farmers sell 13% of their cassava production, compared to only 3-4% marketed by farmers in central and southern Mozambique.³⁴ In general in Mozambique, the cassava products available in the market are the fresh dried roots, the leaves and those products obtained by semi-processing and processing bitter and sweet cassava: dried roots, flour, rale, boiled roots, fried roots, roasted roots, toasted roots and liquor.³⁵ It is estimated that 70% of the total cassava production in Mozambique is utilized as human food. Roots and leaves provide a major source of carbohydrate and vitamins. In rural areas of Mozambique, cassava, maize and sweet potato, are the main sources of food security; particularly in areas prone to drought and floods, cassava is the main crop. It occupies the first place in terms of production volume as a basic food crop, and is a staple food for more than 50% of the population in the northern and central regions of the country.

³⁴ Donovan et al. (2011)

³⁵ A wide range of value added products that can be made from cassava. FAO classifies cassava products into Food (traditional: fresh, flour and pastes), Feed (chips, pellets and leaf mixtures) and Others, including starch-based uses (food and non-food products). Regarding industrial uses: cassava has numerous applications. In the food industry, cassava is used in its starch form. In non-food industries, it is used mostly as a raw material in the manufacture of products such as plywood, paperboard, textiles etc. Cassava also can be used in the production of biofuels because of the high carbohydrate content.

Product	Notes
	<ul style="list-style-type: none"> • There's a lack of interaction between rural communities and industry – cassava is grown everywhere but no one is making large-scale profits from it. • Cassava is mostly marketed domestically. There is very little international trade in cassava among the majority of producing countries in Africa. • The FAO estimates that by substituting cassava for flour in bread, Mozambique could save at least USD15 million per year. • Industrial processing of cassava is a recent activity in Mozambique, consisting of production of cassava-based clear beer. Cervejas de Moçambique produces cassava beer production in Nampula province, while Impala Beer is produced in the south of Mozambique. • Industrial processing of cassava for cassava-based ethanol production is in the experimental phase in the central region of Mozambique. The increase of cassava production would reduce the fuel trade deficit, if cassava-based ethanol can be used for home fuel use.
Pigeon pea	<ul style="list-style-type: none"> • Mozambique is the fifth largest pigeon pea producer and the third largest exporter in the world, and benefits from seasonal price effects.³⁶ • There is little to no domestic consumption of pigeon pea in Mozambique.³⁷ • Pigeon pea is one of the fastest growing crops in Mozambique (annual growth rate of 8 percent since 2002).³⁸ • Growth comes from more households cultivating pigeon pea rather than increased area per household. Pigeon pea has very stable yields and is very difficult to intensify even if grown at a large scale.³⁹ Thus, growth can only come from more producers rather than from improved cultivation practices. • Pigeon pea is mainly produced by smallholders. More than one million households grow pigeon pea in Mozambique.⁴⁰ • A potential export tax on pigeon pea intended to stimulate domestic processing may cut producers' farmgate prices and incomes by 20%, which is a risk to the sustainability of this crop for smallholders.⁴¹ • India is the world's largest importer and consumer of pigeon pea and absorbs all of Mozambique's production. Growth in India import demand is driven by stagnating domestic Indian production, which in turn is stimulating Mozambican pigeon pea production.⁴² • Mozambique mainly exports whole (not split) pigeon pea due to the small premium from processing.⁴³ • Zambezia produces almost all of Mozambique's pigeon pea; processing occurs in Zambezia, Nampula and Sofala. Zambezia has good climatic conditions and successful initiatives to diffuse seeds and new varieties. Small volumes are produced in all other northern and central regions. Southern Mozambique is not suitable for pigeon pea production due to too little rainfall.

³⁶ Reddy, K. (2014) Prospects for pulse imports in India (Handbook on Minor and Imported Pulses in India.) as cited in Pilot in Mozambique on Small-Scale Entrepreneurship in Value Chains (DRAFT), Technoserve, 6 Nov 2015.

³⁷ Ibid.

³⁸ Source: Research Paper 78E, Mozambique Directorate of Economics of the Ministry of Agriculture, June 2015, as cited in Pilot in Mozambique on Small-Scale Entrepreneurship in Value Chains (DRAFT), Technoserve, 6 Nov 2015.

³⁹ Ibid.

⁴⁰ Ibid

⁴¹ Ibid.

⁴² Reddy, K. (2014) Prospects for pulse imports in India (Handbook on Minor and Imported Pulses in India.) as cited in Pilot in Mozambique on Small-Scale Entrepreneurship in Value Chains (DRAFT), Technoserve, 6 Nov 2015.

⁴³ Ibid.

Product	Notes
Soybean	<ul style="list-style-type: none"> Commercial soybean production is a relatively new undertaking in Mozambique. The product is supported by a high number of donor programs. Though it has a low number of farmers currently (less than 50), the smallholder uptake rate is strong. The sector is expected to grow quickly and be highly profitable due to strong local, regional and global demand. Production requires technical skills, as the crop is technically difficult to grow.
Sugar	<ul style="list-style-type: none"> Sugar and cashew are two of the main food product exports of Mozambique. Mozambique's sugar exports are wholly of raw, rather than refined, sugar. Reportedly, the sugar companies argue that the price differential between raw and refined sugar in international markets would not cover their costs of refining.⁴⁴ Indeed, the spread between the product prices is narrow, particularly for African buyers, who pay only USD13/ton more for refined versus raw sugar (see Table 10).

Source: Compiled by Global Development Solutions, LLC

4.2. Market Demand

Import quantity and value were examined as a proxy for non-domestic market demand. Aggregate import data for 2012 (most recent year available per FAOSTAT) by region and world are noted below. Soybeans and sugar present the highest demand both within Africa and globally, relative to cashew and cassava. Import demand for soybean and processed soybean products (e.g., soybean oil and soya sauce) was USD3.5 billion in Africa and USD70.0 billion globally in 2012, while import demand for processed sugar products (e.g., refined sugar, raw centrifugal sugar and confectionary sugar) was USD6.1 billion in Africa and USD44.3 billion globally in 2012. Aggregate cashew demand was USD37.7 million in Africa and USD3.5 billion globally in 2012; however, cashew, and specifically shelled cashew nuts, command the highest prices (implied import unit value of USD7,279/ton). Aggregate cassava demand was USD13.3 million in Africa and USD3.5 billion globally in 2012 and commanded the lowest unit prices of all shortlisted processed products. FAOSTAT did not report on imports of pigeon pea.

Table 10: Aggregate Regional and Global Import of Shortlisted Agriculture Products, 2012

Category	Aggregate import quantity (tons)		Aggregate import value (USD 000)		Product	Import quantity (tons)		Import value (USD 000)		Implied import unit value (USD/ton)	
	Africa	World	Africa	World		Africa	World	Africa	World	Africa	World
Cashew	9,307	1,245,359	37,696	3,549,662	Cashew nuts, shelled	6,481	345,622	35,279	2,515,889	5,443.45	7,279.31
					Cashew nuts, with shell	2,826	899,737	2,417	1,033,773	855.27	1,148.97
Cassava	44,261	11,638,793	13,299	3,457,640	Cassava dried	20,667	8,747,705	1,791	2,113,857	86.66	241.65
					Starch, cassava	23,594	2,891,088	11,508	1,343,783	487.75	464.80
					Soybeans	2,366,313	96,029,277	1,364,394	57,391,521	576.59	597.65
Soybeans	4,064,849	105,936,184	3,490,255	69,791,364	Oil, soybean	1,693,900	9,593,564	2,118,647	11,907,223	1,250.75	1,241.17
					Soya sauce	4,636	313,343	7,214	492,620	1,556.08	1,572.14
					Sugar confectionery	266,432	2,976,206	458,328	9,439,562	1,720.24	3,171.68
Sugar	9,286,294	55,976,710	6,101,912	44,260,539	Sugar raw centrifugal	5,107,138	32,082,759	3,166,458	19,267,936	620.01	600.57
					Sugar refined	3,912,724	20,917,745	2,477,126	15,553,041	633.09	743.53

Data is for 2012 (most recent year available).

FAOSTAT did not report any import of pigeon pea.

Source: Global Development Solutions, LLC, analysis of data by FAOSTAT

⁴⁴ John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

4.2.1. Regional Demand

Regional demand within Africa, as indicated by import volume, for the shortlisted products is highlighted below and further detailed in the respective product annexes.⁴⁵

Table 11: Details of African Demand for Shortlisted Agriculture Products, 2012

Product	Notes
Cashew	<ul style="list-style-type: none"> FAOSTAT reported imports of cashew nuts shelled and cashew nuts with shell. Other than South Africa, African demand for shelled cashew nuts is led largely by north Africa. During 2012, African imports of cashew nuts shelled totaled 6,481 tons; top importers were South Africa, Algeria, Egypt, Tunisia and Morocco. African imports of cashew nuts with shell totaled 2,826 tons in 2012 and were led by Ghana, Egypt, Burkina Faso, Togo and Morocco.
Cassava	<ul style="list-style-type: none"> FAOSTAT reported imports of dried cassava and cassava starch. During 2012, African imports of dried cassava totaled 20,667 tons and were led by Uganda, Rwanda, Burundi, South Africa and Togo. In 2012, African imports of cassava starch totaled 23,594 tons and were led by South Africa, Senegal, Nigeria, Ghana and Swaziland. South Africa ranked 10th globally for cassava starch import volume in 2012.
Pigeon pea	<ul style="list-style-type: none"> FAOSTAT did not report on imports of pigeon pea. African imports could not be ascertained.
Soybean	<ul style="list-style-type: none"> FAOSTAT reported imports of soybeans, soybean oil and soya sauce. Africa imported 2.4 million tons of soybeans in 2012, which amounted to 2.5% of global import volume. Regional imports were led by Egypt, Tunisia, Morocco, Burkina Faso and Nigeria. Africa soybean oil imports totaled 1.7 million tons in 2013 or 17.7% of global import volume. Besides South Africa, leading African importers of soybean oil included Algeria, Morocco and Egypt. African imports of soya sauce totaled 4,636 tons in 2012 and were led by South Africa, Mauritius, Ghana, Egypt and Kenya.
Sugar	<ul style="list-style-type: none"> FAOSTAT reported imports of raw centrifugal sugar, refined sugar and confectionary sugar. Unlike the other product categories, demand for sugar is widespread among many importers. During 2012, African imports of raw centrifugal sugar totaled 5.1 million tons (15.9% of global import volume). Leading importers were Algeria, Morocco, Nigeria, Egypt and Tunisia. During 2012, African imports of refined sugar totaled 3.9 million tons (18.7% of global import volume). Leading importers were Nigeria, Somalia, Tanzania, Angola and Tunisia; however other African countries bought 2.7 million tons (68% of total). African imports of confectionary sugar totaled 266,432 tons in 2012 and were led by Tanzania, Angola, South Africa, Ghana and Algeria.

Source: Global Development Solutions, LLC, analysis of FAOSTAT

4.2.2. Global Demand

⁴⁵ Annexes referenced herein can be found under separate cover: Study Design Report, [Volume 1 Annex: Background and Market Trends](#)

Global demand, as indicated by import volume, for the shortlisted products is highlighted below and further detailed in the respective product annexes.

4.2.2.1. Cashew

Global import volume of cashew nuts with shell is about 1.3 to 2.5 times that of cashew nuts shelled, indicating a preference for self-processing among importing countries. Global import of cashew nut with shell is limited almost entirely to India (91.3% of 2012 global import quantity) and Brazil (6.6%).

Table 12: Leading Global Importers of Cashew Nuts, with Shell

Country	Import quantity (tons)					Percent of 2012	Change 2008-2012
	2008	2009	2010	2011	2012		
1 India	612,959	752,463	448,829	798,281	821,648	91.3%	34.0%
2 Brazil	9,467	4,472	0	43,698	59,450	6.6%	528.0%
3 China	694	925	1,372	943	7,072	0.8%	919.0%
4 France	2,162	2,101	2,034	2,317	1,784	0.2%	-17.5%
5 United Arab Emirates	9	2,498	4,532	4,324	1,304	0.1%	14388.9%
6 Saudi Arabia	0	407	947	1,125	1,264	0.1%	NA
7 Ghana	93	181	24	4,500	1,002	0.1%	977.4%
8 Sri Lanka	246	923	179	1,205	953	0.1%	287.4%
9 Egypt	63	319	68	121	784	0.1%	1144.4%
10 USA	1,189	1,282	2,156	1,134	746	0.1%	-37.3%
Other	5,675	7,274	9,481	6,812	3,730	0.4%	-34.3%
World	632,557	772,845	469,622	864,460	899,737	100.0%	42.2%

Ranked by 2012 import quantity (most recent year available).

No imports of cashew nuts with shell were reported for 2008-2012 for Mozambique.

Source: FAOSTAT

Import volume of shelled cashew nuts is relatively fragmented, demonstrating wide-spread global demand for shelled cashews. Leading importers include USA (31.6% of import quantity in 2012), Netherlands (11.8%) and Germany (7.3%); however, countries outside the top 10 comprise 27.2% of world import demand. Mozambique is self-sufficient in cashew production and ranked 127th for import volume of shelled cashew nuts in 2013.

Table 13: Leading Global Importers of Cashew Nuts, Shelled

Country	Import quantity (tons)					Percent of 2012	Change 2008-2012
	2008	2009	2010	2011	2012		
1 USA	112,415	116,934	119,113	104,774	109,104	31.6%	-2.9%
2 Netherlands	49,320	46,615	41,271	41,602	40,870	11.8%	-17.1%
3 Germany	19,175	22,886	25,447	24,084	25,159	7.3%	31.2%
4 Australia	14,697	13,952	15,041	13,113	15,326	4.4%	4.3%
5 United Kingdom	19,265	16,422	12,922	11,806	13,175	3.8%	-31.6%
6 United Arab Emirates	18,120	20,116	15,315	28,589	11,553	3.3%	-36.2%
7 Canada	10,210	9,228	9,419	8,387	10,198	3.0%	-0.1%
8 Russian Federation	8,927	5,945	8,243	8,358	9,806	2.8%	9.8%
9 China	28,114	38,507	26,649	13,045	8,960	2.6%	-68.1%
10 Japan	6,171	6,101	6,644	6,190	7,602	2.2%	23.2%
127 Mozambique	NA	NA	NA	NA	1	0.0%	NA
Other	76,971	78,009	83,229	78,311	93,868	27.2%	22.0%
World	363,385	374,715	363,293	338,259	345,622	100.0%	-4.9%

Ranked by 2012 import quantity (most recent year available).

Source: FAOSTAT

4.2.2.2. Cassava

During 2012, the leading importers of dried cassava included China, (responsible for nearly 82% of global import of dried cassava), Thailand (9.4%) and Republic of Korea (6.5%). All other countries reported less than 1.1% of global import volume. Mozambique did not report any dried cassava imports during 2008 to 2012.

Table 14: Leading Global Importers of Cassava, Dried

Country	Import quantity (tons)					Percent of 2012	Change 2008-2012
	2008	2009	2010	2011	2012		
1 China	2,003,718	6,116,992	5,762,872	5,027,055	7,138,893	81.6%	256.3%
2 Thailand	85,288	324,172	130,645	309,858	819,564	9.4%	860.9%
3 Republic of Korea	899,724	551,734	293,247	329,339	566,026	6.5%	-37.1%
4 USA	59,454	61,991	64,732	62,769	93,533	1.1%	57.3%
5 Japan	36,750	31,872	20,605	31,455	31,814	0.4%	-13.4%
6 Brazil	2,124	0	25,287	23,358	15,175	0.2%	614.5%
7 Indonesia	23	1,903	21	30	13,291	0.2%	57687.0%
8 Netherlands	116,260	17,322	10,778	11,587	11,590	0.1%	-90.0%
9 Uganda	1,655	20,319	24	877	10,283	0.1%	521.3%
10 Spain	271,984	9,592	8,943	7,939	7,628	0.1%	-97.2%
Other	420,695	52,865	63,027	50,904	39,908	0.5%	-90.5%
World	3,897,675	7,188,762	6,380,181	5,855,171	8,747,705	100.0%	124.4%

Ranked by 2012 import quantity (most recent year available).

No imports of cassava, dried, were reported for 2008-2012 for Mozambique.

Source: FAOSTAT

Leading importers of cassava starch during 2012 included China, Indonesia and Malaysia. Global cassava starch import volume grew 83.7% from 2008 to 2012. Mozambique reported limited import of cassava starch (2 tons in 2012) and ranked 102nd for 2012 global import

volume. Regionally, South Africa imports fell 25.3% from 2008 to 2012, though with 18,661 tons, the country still ranked in the top 10 for import volume as of 2012.

Table 15: Leading Global Importers of Cassava Starch

Country	Import quantity (tons)					Percent of 2012	Change 2008-2012
	2008	2009	2010	2011	2012		
1 China	735,667	1,227,274	1,055,332	1,227,818	1,405,243	48.6%	91.0%
2 Indonesia	158,077	166,813	294,832	435,419	757,926	26.2%	379.5%
3 Malaysia	121,240	167,463	178,331	182,041	184,685	6.4%	52.3%
4 Japan	150,331	137,053	105,344	133,966	155,983	5.4%	3.8%
5 Philippines	72,353	91,784	58,363	54,123	62,578	2.2%	-13.5%
6 USA	34,664	25,208	33,483	36,089	58,541	2.0%	68.9%
7 Singapore	45,162	48,821	49,365	53,215	54,095	1.9%	19.8%
8 Republic of Korea	20,467	35,030	9,242	20,561	44,619	1.5%	118.0%
9 Bangladesh	25,706	32,802	30,203	23,035	19,345	0.7%	-24.7%
10 South Africa	24,989	21,573	19,702	15,237	18,661	0.6%	-25.3%
102 Mozambique	0	0	0	0	2	0.0%	NA
Other	184,884	140,351	119,320	176,430	129,410	4.5%	-30.0%
World	1,573,540	2,094,172	1,953,517	2,357,934	2,891,088	51.4%	83.7%

China includes mainland China, Hong Kong SAR and Taiwan.

Ranked by 2012 import quantity (most recent year available).

Source: FAOSTAT

FAOSTAT did not report any countries with imports of other forms of cassava during 2008 to 2012.

4.2.2.3. Pigeon Pea

FAOSTAT does not report trade (exports or imports) of pigeon peas. According to other sources,⁴⁶ India is the world's largest importer and consumer of pigeon peas, and India absorbs all of Mozambique's production, as there is little to no domestic pigeon pea consumption in Mozambique. Mozambique reportedly is the 3rd largest pigeon pea exporter in the world and benefits from seasonal price effects. Mozambique mainly exports whole (not split) pigeon peas, due to the low premium from processing. India's import demand for pigeon peas is expected to continue growing for the coming decade, since India's domestic production has declined and cannot meet local demand.

4.2.2.4. Soybeans

Leading global importers of soybeans include China (63.3% of import volume in 2012), Mexico and Germany (each 3.6%). While global import volume grew 21.4% from 2008 to 2012, China appears to have unceasing demand, since China's growth in import volume increased 53.6% during the same period. Mozambique ranked 75th in 2012 with an import volume of 3,279 tons.

⁴⁶ Reddy, K. (2014) Prospects for pulse imports in India (Handbook on Minor and Imported Pulses in India.) as cited in Pilot in Mozambique on Small-Scale Entrepreneurship in Value Chains (DRAFT), Technoserve, 6 Nov 2015.

Table 16: Leading Global Importers of Soybeans

Country	Import quantity (tons)					Percent of 2012	Change 2008-2012
	2008	2009	2010	2011	2012		
1 China	39,563,078	44,951,255	57,379,915	54,834,369	60,765,498	63.3%	53.6%
2 Mexico	3,507,196	3,425,920	3,772,163	3,340,376	3,477,274	3.6%	-0.9%
3 Germany	3,484,861	3,165,419	3,383,117	3,189,579	3,447,342	3.6%	-1.1%
4 Spain	3,275,286	2,933,498	3,127,079	3,176,843	3,313,170	3.5%	1.2%
5 Netherlands	4,013,271	3,048,210	3,553,436	3,048,719	2,822,559	2.9%	-29.7%
6 Japan	3,711,043	3,390,080	3,455,633	2,830,773	2,727,400	2.8%	-26.5%
7 Thailand	1,723,273	1,534,551	1,818,705	1,994,378	2,119,941	2.2%	23.0%
8 Indonesia	1,173,097	1,314,620	1,740,505	2,088,616	1,921,207	2.0%	63.8%
9 Egypt	1,192,400	1,471,700	1,752,302	1,712,400	1,815,300	1.9%	52.2%
10 Italy	1,647,103	1,368,041	1,550,149	1,240,717	1,207,329	1.3%	-26.7%
75 Mozambique	36	137	239	2,129	3,279	0.0%	9008.3%
Other	15,810,625	14,209,995	14,498,459	13,842,289	12,408,978	12.9%	-21.5%
World	79,101,269	80,813,426	96,031,702	91,301,188	96,029,277	100.0%	21.4%

Ranked by 2012 import quantity (most recent year available).

China includes mainland China, Hong Kong SAR, Macao SAR and Taiwan.

Source: FAOSTAT

Leading importers of soybean oil include China (19.6% of import volume in 2012), India (11.4%) and Iran (5.3%). However, soybean oil import is highly fragmented, with the “other” (i.e. global import excluding top 10, South Africa and Mozambique) comprising 35.1% of global import volume. Mozambique reported importing nearly 13,000 tons of soybean oil in 2012, ranking it 68th for global import volume, while neighboring South Africa ranked 12th and imported nearly 200,000 tons of soybean oil in 2012.

Table 17: Leading Global Importers of Soybean Oil

Country	Import quantity (tons)					Percent of 2012	Change 2008-2012
	2008	2009	2010	2011	2012		
1 China	2,670,622	2,467,066	1,398,655	1,201,957	1,879,921	19.6%	-29.6%
2 India	698,773	1,100,879	1,132,030	939,375	1,093,539	11.4%	56.5%
3 Iran	351,052	142,702	380,109	632,832	508,395	5.3%	44.8%
4 Algeria	330,991	391,096	375,689	484,491	464,721	4.8%	40.4%
5 Morocco	364,871	394,711	373,563	350,748	391,366	4.1%	7.3%
6 Venezuela	436,364	348,781	361,865	411,652	379,497	4.0%	-13.0%
7 Bangladesh	187,142	394,500	350,000	424,000	373,000	3.9%	99.3%
8 Peru	291,855	272,091	352,015	314,947	343,591	3.6%	17.7%
9 Republic of Korea	287,167	284,461	325,157	301,252	339,864	3.5%	18.4%
10 Colombia	178,510	163,412	221,183	237,698	244,540	2.5%	37.0%
12 South Africa	247,888	137,801	272,963	277,729	197,938	2.1%	-20.2%
68 Mozambique	35,700	10,100	20,500	45,000	12,909	0.1%	-63.8%
Other	5,230,341	3,799,597	4,263,014	4,739,981	3,364,283	35.1%	-35.7%
World	11,311,276	9,907,197	9,826,743	10,361,662	9,593,564	100.0%	-15.2%

Ranked by 2012 import quantity (most recent year available).

China includes mainland China, Hong Kong SAR, Macao SAR and Taiwan.

Source: FAOSTAT

4.2.2.5. Sugarcane

Leading importers of raw centrifugal sugar in 2012 included China (12.0% of global import volume), Indonesia (8.4%) and USA (6.1%). Mozambique imported 12,015 tons and ranked 82nd for global imports in 2012.

Table 18: Leading Global Importers of Raw Centrifugal Sugar

Country	Import quantity (tons)					Percent of 2012	Change 2008-2012
	2008	2009	2010	2011	2012		
1 China	811,980	1,366,756	2,011,516	2,985,226	3,859,795	12.0%	375.4%
2 Indonesia	380,225	1,293,143	1,191,481	2,305,032	2,704,256	8.4%	611.2%
3 USA	1,699,131	1,783,705	2,022,807	2,174,018	1,962,714	6.1%	15.5%
4 Republic of Korea	1,615,474	1,645,947	1,636,041	1,627,088	1,723,055	5.4%	6.7%
5 Malaysia	1,444,097	1,561,148	1,702,275	1,777,745	1,689,563	5.3%	17.0%
6 Algeria	774,809	811,724	1,186,023	1,346,695	1,628,872	5.1%	110.2%
7 Bangladesh	765,458	1,291,494	977,776	1,253,474	1,507,743	4.7%	97.0%
8 Japan	1,396,220	1,293,684	1,214,178	1,511,648	1,422,826	4.4%	1.9%
9 Canada	1,334,183	1,019,349	963,294	1,128,903	1,082,720	3.4%	-18.8%
10 United Arab Emirates	182,240	1,116,254	486,767	713,998	1,075,646	3.4%	490.2%
82 Mozambique					12,015	0.0%	NA
Other	15,453,790	14,891,998	17,694,884	17,083,714	13,413,554	41.8%	-13.2%
World	25,857,607	28,075,202	31,087,042	33,907,541	32,082,759	100.0%	24.1%

Ranked by 2012 import quantity (most recent year available).

China includes mainland China, Hong Kong SAR, Macao SAR and Taiwan.

Source: FAOSTAT

Leading importers of refined sugar include Italy (6.2% of global import volume in 2012), USA (5.1%), United Arab Emirates and Iraq (each 4.3%). Mozambique ranked 123rd in 2012 import volume with 10,521 tons. Mozambique import volume fell 79% from 2008 to 2012; it could not be ascertained whether the country is developing self-sufficiency or substituting product. Overall global import volume was nearly flat, growing only 2.6% from 2008 to 2012.

Table 19: Leading Global Importers of Refined Sugar

Country	Import quantity (tons)					Percent of 2012	Change 2008-2012
	2008	2009	2010	2011	2012		
1 Italy	833,134	1,100,594	1,209,483	1,283,465	1,298,320	6.2%	55.8%
2 USA	916,856	727,594	893,891	1,287,390	1,071,621	5.1%	16.9%
3 United Arab Emirates	819,652	903,479	1,264,795	1,170,881	896,299	4.3%	9.4%
4 Iraq	725,741	217,711	412,880	720,178	895,795	4.3%	23.4%
5 Belgium	379,157	651,077	690,119	645,187	702,907	3.4%	85.4%
6 China	609,000	453,749	469,261	665,943	639,458	3.1%	5.0%
7 Yemen	279,657	357,483	604,453	456,013	635,190	3.0%	127.1%
8 Germany	565,983	453,396	427,814	502,940	542,537	2.6%	-4.1%
9 Uzbekistan	483,200	510,900	539,700	531,000	540,300	2.6%	11.8%
10 Sri Lanka	538,487	441,099	508,397	603,510	524,281	2.5%	-2.6%
123 Mozambique	50,600	107,790	69,192	49,906	10,521	0.1%	-79.2%
Other	14,180,677	13,788,375	14,898,975	14,215,753	13,160,516	62.9%	-7.2%
World	20,382,144	19,713,247	21,988,960	22,132,166	20,917,745	100.0%	2.6%

Ranked by 2012 import quantity (most recent year available).

China includes mainland China, Hong Kong SAR, Macao SAR and Taiwan.

Source: FAOSTAT

Leading importers of confectionery sugar in 2012 included USA (18.3% of global import volume), Germany (5.4%), United Kingdom (5.3%) and Canada (3.7%). Mozambique imported 2,003 tons and ranked 125th for global imports in 2012.

Table 20: Leading Global Importers of Confectionery Sugar

Country	Import quantity (tons)					Percent of 2012	Change 2008-2012
	2008	2009	2010	2011	2012		
1 USA	545,066	513,306	542,680	544,102	545,444	18.3%	0.1%
2 Germany	146,322	139,689	154,192	154,792	159,814	5.4%	9.2%
3 United Kingdom	140,920	141,729	144,451	155,516	158,225	5.3%	12.3%
4 Canada	106,386	99,245	104,840	103,374	110,094	3.7%	3.5%
5 France	95,812	90,631	96,102	98,352	98,663	3.3%	3.0%
6 Russian Federation	73,116	69,398	82,411	83,624	87,320	2.9%	19.4%
7 China	71,831	64,272	73,518	75,568	78,925	2.7%	9.9%
8 Netherlands	72,316	82,138	78,184	83,900	78,433	2.6%	8.5%
9 Belgium	58,261	68,308	69,941	74,657	73,338	2.5%	25.9%
10 Sweden	53,261	53,277	49,954	57,943	66,184	2.2%	24.3%
125 Mozambique	8,618	10,188	6,229	8,131	2,003	0.1%	-76.8%
Other	1,354,972	1,297,677	1,380,822	1,525,194	1,517,763	51.0%	12.0%
World	2,726,881	2,629,858	2,783,324	2,965,153	2,976,206	100.0%	9.1%

Ranked by 2012 import quantity (most recent year available).

China includes mainland China, Hong Kong SAR, Macao SAR and Taiwan.

Source: FAOSTAT

4.2.3. Average Market Price

Average produce prices for the shortlisted agriculture products are shown below. Among the short listed products, pigeon pea and cashew obtained the highest global average prices in 2013

(USD1,628/ton and USD1,169/ton, respectively), while sugarcane was the lowest in all years reviewed (USD119/ton to 245/ton during 2009-2013). Producer prices have been declining for sugarcane (-30%), and to a lesser extent for pigeon pea (-5%), while they have risen dramatically for soybean (62%) in recent years. Pricing trends are further illustrated in the figure below, where it is evident that cashew prices are high but erratic relative to the other products, and soybean and pigeon pea exhibit higher prices and more stable growth. Cassava and sugarcane appear to have less producer income potential relative to the other products considered. Producer prices vary widely by country and year; data shown here is an indication of relative market opportunity rather than a guarantee of outcome for future production in Mozambique.

Table 21: Global Annual Producer Prices, Shortlisted Agriculture Products

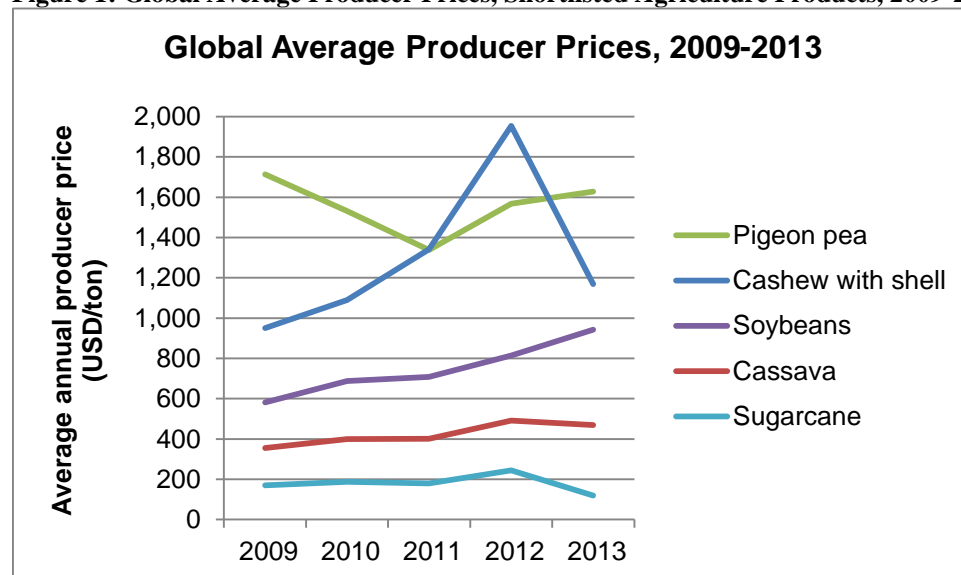
Product	Average annual producer price (USD/ton)					Change 2009-2013
	2009	2010	2011	2012	2013	
Cashew with shell	950.97	1,089.98	1,342.17	1,954.45	1,169.20	22.9%
Cassava	355.15	399.31	400.65	490.70	469.69	32.3%
Pigeon pea	1,713.43	1,532.18	1,338.55	1,568.41	1,627.62	-5.0%
Soybeans	581.24	687.69	708.99	814.29	942.42	62.1%
Sugarcane	169.64	187.01	179.31	244.53	118.80	-30.0%

Average (mean) producer prices of countries reported by FAOSTAT, 2009-2013.

Historic global average price is not indicative of future price that may be obtained by Mozambique.

Source: FAOSTAT

Figure 1: Global Average Producer Prices, Shortlisted Agriculture Products, 2009-2013



Source: Global Development Solutions, LLC analysis of FAOSTAT data

4.3. Employment and Income Potential

Each of the agricultural products selected for consideration offers different income and employment opportunities for the country. An important consideration before a product is

selected for survey and analysis is that the income and employment stream for one suggested product, cashew, has the potential of generating the highest income for poor households among the potential products, and employs a substantial number of unskilled workers, particularly during harvest season, but does not generate any income for at least the first three years following planting, during which time alternative income generating opportunities must be sought. Moreover, smallholder farmers would not only need to tend to the trees during the early tree development stage, which requires substantial amount of time and technical skills, but more importantly, the need to tend to the orchard takes away time from alternative income generation activities. This would add another layer of complexity in project implementation, as alternative funding sources will be required to help support the livelihoods of farmers engaged in cashew production.

The following section provides a comparison of potential income generating opportunities according to crop, labor input requirements, potential employment multiplier effects, and start-up costs and operating capital required for production.

Climatic conditions and crop suitability: All five crops under consideration perform well at temperatures ranging from 15 – 35°C, which is generally within range of temperatures experienced in the northern region (18 – 29°C). With regard to water availability, all of the crops perform well in areas where rainfall rates range between 450 mm and 1,500 mm. The average precipitation in the northern region is 1,068 mm. This suggests that all of the crops can potentially be grown under rainfed agriculture, and do not necessarily require investment in irrigation systems, which is generally prohibitive for smallholder farmers. It should be noted, however, that for cashew production the water requirement during the early planting phase is high and regular watering is required, particularly during the establishment and preliminary growth periods of the cashew seedling. As a result, for cashew production, while installation of irrigation systems may not be a pre-requisite for engaging in cashew farming, access to a readily available water supply will help reduce the chances of crop failure.

Income generating potential: On a per hectare basis, cashew offers the highest potential income generating opportunities for smallholder farmers. While the revenue generating potential is high for cashews (USD7,500/ha), farmers are not expected to have any income for the first three years, and are likely to take four years for any meaningful income to be generated. This poses a critical challenge for farmers regarding sources for income during the start-up phase of cashew production.

On the other hand, soybean farming can generate as much as USD405/ha from the first year, and given the cropping cycle, farmers have the opportunity to grow a second crop during the same year to further supplement their income. For example, if a farmer cultivates soybean and a second crop, the second cropping cycle could help generate another USD300/ha, which would translate to USD705/ha per year. Furthermore, technical skills required is substantially less for soybean farming when compared to cashew production, thus improving the farmers' chances of securing income from farming.

Of the five products, pigeon pea exhibited the lowest income generating opportunity (USD165/ha) for farmers, but requires the least amount of technical skills, knowledge and input.

Table 22: Key Indicators to Guide the Product Selection Process

Key Product Indicators	Cashew (1)	Cassava (2)	Pigeon Pea (3)	Soybean (4)	Sugarcane (5)
Yield/hectare (kg)	1,000	10,800	1,200	1,200	56,800
Revenue/hectare (USD)	\$ 7,500	\$ 333	\$ 165	\$ 405	\$ 308
Labor input/hectare (man-days)	180	168	85	51	138
Employment multiplier		2.3	1.2	1.9	2.4
Establishment cost (USD/ha)	\$ 5,711	\$ 163	\$ 271	\$ 133	\$ 179
Operating cost (USD/ha/yr)	\$ 286	\$ 347	\$ 393	\$ 285	\$ 582
Temperature requirement (C)	25	25 - 29	18 - 30	15 - 35	25 - 35
Minimum rainfall requirement (mm/yr)	1,000	1,000 - 1,500	625 - 2,000	450 - 700	1,100 - 1,500

- (1) Investing in Tropical Trees, Dexter B. Dombro, June 24, 2012
Cashew Sector Development in Vietnam, Nguyen Ngoc Que, Nguyen Tien Manh,
www.ciem.org.vn/Portals/1/CIEM/SurveyData/1184295970440.doc
<http://www.ab.bw.bj/s/index.php/bojaas/article/viewFile/184/64>
<http://www.nda.agric.za/docs/Infopaks/cashew.htm>
- (2) Cassava: a guide to sustainable production intensification, FAO. 2013.
Cassava processing, FAO. 2011. Role of Cassava in development project:
The case of the 'Back-to-the Land' project in Bahia, Brazil, 1994.
<http://www.cassavabit.org/agroenterprise/farming.htm>
<http://www.fao.org/docrep/007/y2413e/y2413e07.htm>
- (3) The economics impact of agriculture in Sedgwick County, KS. John Leatherman, August, 2006.
Profitability analysis of pigeon pea production in Riyom LGA of Plateau State (Nigeria).
M.E. Enefeje, V.I. Joshua, C. Nwadike, A.Y. Yaroson, N.D.E. Zwalnan, International Letters of Natural Science, 2014.
<http://www.fao.org/ag/agnp/doc/gbase/data/pf000150.htm>
A value chain analysis for pigeon pea in southern regions of Tanzania, O. Mponda, B. Kidunda, B. Bennett, A. Orr
Socioeconomic Discussion Paper Series, Series Paper Number 17, ICRISAT, Nairobi, 2013.
<http://www.fao.org/ag/agnp/doc/gbase/data/pf000150.htm>
- (4) World soybean production: area harvested, yield, and long-term projections, T. Masuda, P.D. Goldsmith. International Food and Agribusiness Management Review, Vol 12, Issue 4, 2009.
<http://www.indexmundi.com/commodities/?commodity=soybeans>
History of soybeans and soy foods in France (1665 - 2015), W. Shurtleff, A. Aoyagi, 2015.
An analysis of the importance of agriculture and the food sector to the Michigan Economy, J. Ferris, Staff Paper 00-11, Department of Agricultural Economics, Michigan State University, 2000.
<https://www.agrifinfacility.org/.../Detailed%20Crop%20Cost%20Calculati...>
http://www.fao.org/nr/water/cropinfo_soybean.html
- (5) Land use dynamics and sugarcane production, G. Fischer, E. Teixeira, E.T. Hicnyik, H.vanVelthuisen, 2007.
Structural changes in the sugar market and implications for sugarcane smallholders in developing countries, FAO commodity and trade policy research working paper No. 37, E. Amrouk, M.A. Rokotoarisoa, K. Chang, 2013.
Profitability of smallholder sugarcane farming in Swaziland: The case of Komati Downstream Development Programme Sugar Farmers' Association, 2005 - 2011.
M.B. Dlamini, M.V. Masuku, Sustainable Agriculture Research, Vol 2, No. 1, 2013.
Swaziland - Labour Market Profile, 2012. Ulandssekretariatet, LO/FTF Council, 2012.
http://www.ulandssekretariatet.dk/sites/default/files/uploads/public/Afrika/Landeanalyser/labour_market_profile_2012_-_swaziland_web.pdf
http://annualreport.illovo.co.za/2014/downloads/illovo_iar_2014_sustainability.pdf
http://agritech.mau.ac.in/agriculture/agri_costofcultivation_sugarcane.html
<http://www.sugarcaneecrops.com/climate/>

Compiled by Global Development Solutions, LLC

Labor input: From a labor input perspective, international benchmarks⁴⁷ indicate that cashew offers the highest employment opportunity (180 person-days/ha/year), particularly as cashew harvest is done manually. At the same time, however, cassava production also offers a good job creation opportunity with 168 person-days/ha/year of labor input. Here again, manual labor is required for harvesting cassava, which contributes to the relatively high labor requirement.

The lowest labor contributor among the potential crops is soybean with only 51 person-days/ha/year. With this said, however, an alternative way of approaching the labor input issue is that while soybean production does not create substantial job opportunities, given the limited time required to cultivate soybean, assuming that there are other employment opportunities in the target area, a farmer can spend the remaining time in other productive income generating endeavors to help generate additional household income.

⁴⁷ Irrespective of labor source (family or hired)

Employer multiplier effect: No benchmarking figures were available for the employment multiplier effect of cashew production, however, research suggests that sugarcane and cassava cultivation have the largest employment multiplier effect (2.4 and 2.3 respectively). This suggests that each direct job associated with sugarcane production will generate an additional 2.4 indirect and induced jobs in the economy, likewise for cassava with an additional 2.3 indirect jobs. While the difference in multiplier effect between sugarcane and cassava is small (0.1), value added activities associated with sugarcane generally take place in large commercial mills and do not respond to job creation opportunities for smallholders. On the other hand, however, value added activities associated with cassava can take place as smallholder activities (as well as large scale commercial activities). In this regard, some consideration is required to take into account the type of value added spillover effect that each product offers.

Establishment and operating costs: For smallholder farmers and poor households, access to capital is a critical factor that defines the range of productive income generating activities that they can engage in. In the case of cashew production, while it offers substantial income generating opportunities, the upfront capital required for establishing a cashew farm is USD5,711/ha, well above what most smallholder farmers have at their disposal. While operating cost per hectare per year for cashew farming is relatively low compared to other crop options, given the high technical skills and know-how required to operate a productive cashew farm, the likelihood that a smallholder farmer would lose trees to disease and from improper tree husbandry is much greater compared to other crops, thus making it a less desirable choice.

4.4. Summary of Shortlisted Agricultural Products

A summary of the strengths and weaknesses of selecting each of the shortlisted agricultural products is provided below.

Table 23: Summary Pros and Cons of Product Selection

Product	Pros	Cons
Cashew	<ul style="list-style-type: none"> • High number of smallholder participants • High unit value • Above average expected growth rate • Average profitability • Relatively strong growth (7%) 	<ul style="list-style-type: none"> • Low current production volume and value • Low average production value per farmer implies need for consolidation to generate employment • Variable demand season to season • Trees need upgrading; long wait time until new tree is productive
Cassava	<ul style="list-style-type: none"> • High current production volume and value • High number of smallholder participants • High production value per farmer, indicating higher commercial potential • High unit value 	<ul style="list-style-type: none"> • Low expected growth rate • Limited commercial market • Low growth

Pigeon pea	<ul style="list-style-type: none"> • High number of donor support programs • High number of smallholder participants (more than 1 million) • 5th largest producer globally • Above average expected growth rate • Rising demand from India (top global consumer) • Relatively high prices (but falling) 	<ul style="list-style-type: none"> • Low average production value per farmer • Need for consolidation to generate employment • Little to no domestic consumption • Almost all production exported to India, too dependent on single market • Limited opportunity to grow sector except through more farmers and planted area
Soybean	<ul style="list-style-type: none"> • High number of donor support programs • High unit value • High expected growth rate • Highly profitable • Strong recent smallholder uptake • Strong demand/growth regionally and globally 	<ul style="list-style-type: none"> • Low number of farmers currently • Low current production volume and value • Sophisticated crop, requiring technical skill • Many other donor interventions planned
Sugarcane	<ul style="list-style-type: none"> • High current production volume • High production value per farmer, indicating higher commercial potential • Large scale • Assured market • Companies provide land preparation services/fertilizer 	<ul style="list-style-type: none"> • Currently low number of farmers • Low number of donor support programs • Low unit value • Low expected growth rate • Limited processing or value added (international markets do not cover the costs of refining) • EU might open up trade to other developing countries, limiting market

Source: Compiled by Global Development Solutions, LLC

4.1. Donor Support Programs

Several donor programs are underway in northern Mozambique and nationally in support of the shortlisted agriculture products (see table below).⁴⁸ The greatest number (14) is for oilseeds and pulses products, including soybeans and pigeon peas, although the number of programs specific to the shortlisted products could not be ascertained. A high number of dedicated programs indicate that the product or industry is well supported. The Let's Work Program could build on existing donor support (while coordinating so as to avoid redundancy), or could focus investment on areas which are not yet supported in order to diversify employment opportunity.

⁴⁸ Agriculture donor programs (not exclusive to shortlisted products) include: PROMER & PRONEA (IFAD), Feed the Future (USAID), Farm Business Advisors (Swedish), Seed Multiplication (DutchAid), Farmers' Club Project (Finland), Horti Sempre (Swiss), PROIRRI (World Bank), Inovagro I&II (Swiss), AGRO-INVESTE (Denmark), Promoting Export Quality Horticulture (Irish Aid), FinAgro (USAID), Program to Support Rural Development (Italian), AgroForestry (USDA), Portucel community development program (IFC/Portucel), SNV Sesame Value Chain (Dutch). Source: Pilot in Mozambique on Small-Scale Entrepreneurship in Value Chains (DRAFT), Technoserve, 6 Nov 2015.

Table 24: Donor Support Programs for Shortlisted Agriculture Products

Category	Products	Number of programs
Oilseeds and pulses	groundnuts, sesame, soybeans , sunflower, beans, cowpeas, pigeon peas	14
Roots and tubers	cassava , potato	6
Nuts	cashew , macadamia	5
Other	Jatropha, Artemisia, forestry, cotton, sugarcane	3

Bold text indicates shortlisted products.

Source: Based on the 2013 Monitor & Deloitte Mozambique Agriculture Related Donor Development Community Activity compilation, filtered for projects still in operation in Nampula, Zambezia, and Manica; when a program targeted multiple crops, it was counted under each crop area; as cited in Pilot in Mozambique on Small-Scale Entrepreneurship in Value Chains (DRAFT), Technoserve, 6 Nov 2015.

4.2. Potential Anchor Firms

Several anchor firms have been identified in the north and nationally for the shortlisted products, including 13 for cashew, 2 for cassava, 2 for pigeon pea, 1 for soybean and 7 for sugarcane (see table below). Such firms are potentially large buyers that can provide consistent, assured demand and/or scalable employment.

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Table 25: Potential Anchor Firms for Shortlisted Agriculture Products

Product	Firm	Sourcing	Market	Other notes
Cashew	OLAM Mozambique Lda	Nampula	Export	Subsidiary of OLAM International. Produces and export cotton, cashew, edible oils. Cashew processing in Nampula province (factories in Monapo, Angoche, Mongicual, Napaco, Geba, Namialo). Edible oil refinery in Beira. 1,095 employees (90% female). Has a 2,000 ha cashew plantation near Angoche, also buys from 3rd party suppliers. The export, marketing and distribution channel for northern processors. Exports processed cashew nuts (USA, Netherlands; small volume to RSA) and raw cashew nuts to Vietnam and India.
	Said Mohammed IKURU	NA	Export	Together with OLAM, accounts for 1/3 of cashew exports.
	Condor Caju Lda	Nampula	Export	Shared ownership by GAPI, NOIB, and 29 farmer groups.
			Export (EU, USA, Middle East, RSA)	Top 3 cashew nut processor. Operates Condor Caju and Condor Nuts, each with capacity of 6,000 tons/year (currently producing about 4,500 tons/year). 2,400 employees. Labor-intensive processing methods.
	Moloque Agro-Processing (MAP)	Zambezia	NA	Based in Alto Moloque in Zambezia. Has modern machinery with capacity of 42,000 tons/year. Currently processes 1,200-1,500 tons of raw cashew annually and exports about 400 tons.
	Miranda Caju	NA	NA	1,493 employees (2008).
	Africaju	NA	NA	Medium-sized firm (100 to 250 employees).
	IPCCM	NA	NA	Medium-sized firm (100 to 250 employees).
	Moma Caju	NA	NA	Medium-sized firm (100 to 250 employees).
	Alexim Ltd	NA	NA	Medium-sized firm (100 to 250 employees).
	Mauricaju	NA	NA	Medium-sized firm (100 to 250 employees).
Cassava	Gan Lda	NA	NA	Medium-sized firm (100 to 250 employees).
	Association of Agribusiness	NA	Export	Holding company formed by group of processors for marketing processed kernels from Nampula province under the brand Zambique.
Cassava	Cervejas de Mocambique (CDM)	Nampula	Domestic	MZB's only domestic beer producer. Subsidiary of SABMiller (UK). In 2011, launched Impala beer made from cassava (70% cassava, 30% malt). Now uses 40,000 tons of cassava annually. Breweries in Nampula (including cassava), Maputo, Beira.
	Dutch Agricultural Development and Trading Company (DADTCO)	NA	Domestic	Specializes in cassava processing. Buys cassava from farmers supported by the International Fertilizer Development Centre. Has mobile processing unit and travels to the regions to process the root within 24 hours, resolving transport issues. Sells processed raw material (cassava flour) to CDM for beer making. Uses AMPU machine, a cassava processing unit capable of churning 3.8 MT of cassava roots into 2 MT of cake within one hour. The company delivers and installs the mobile machine at the farmer level, to then supply nearby breweries with their product.
Pigeon pea	ETG	Nampula	Export (India; potential for China, Japan, EUA, UE, RSA)	Dominant buyer and exporter for MZB pigeon pea. Has processing facility in India, reducing incentive to process in MZB. SNV currently working with ETG outgrowers.
	Indo Africa	Nampula	Asia	NA
Soybean	Corredor Agro	Nacala corridor (Nampula) and Ribaué (Cabo Delgado)	Domestic (poultry and milling companies)	Sourcing grain and oilseeds.
Sugarcane	Magaga Acucar	Maputo	Domestic and export (EU, USA)	Owned by Illovo Sugar, Africa's largest sugar producer. GoM retains a minority stake. Located in Maputo province. Produced 91,000 tons in 2012. Exported 50,409 tons in 2012.
	Acucareira de Xinavane	Maputo	NA	Owned by Tongaat Hulett Sugar. GoM retains a minority stake. Located in Maputo province. Produced 183,000 tons in 2010/11 season.
	Acucareira de Mocambique	Sofala	NA	Owned by Tongaat Hulett Sugar. GoM retains a minority stake. Located in Sofala province. Produces 71,000 tons/year.
	Companhia de Sena	Sofala	NA	Owned by Tereos International (France) via Acucar Guarani (Brazil). GoM retains a minority stake. Located in Sofala province. Produces 73,000 tons/year.
	Distribuidora Nacional do Acucar	NA	NA	Acts as national and export distributor for the 4 above-mentioned factories, which source sugarcane from their own plantation farms and neighboring community-owned cane plantations.
	Riz Industria Limitada	NA	Domestic	Based in Maputo. Manufactures biscuits. Sources sugar domestically.
	AgriSul	Chokwe, Gaza	Export	Export for Tabasco company. Grows and buys sugar.

NA = not available

Source: Pilot in Mozambique on Small-Scale Entrepreneurship in Value Chains (DRAFT), Technoserve, 6 Nov 2015; John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

4.3. Product Selection Recommendation for Agricultural Products

Preliminary research of the agricultural sector in Mozambique, particularly with regard to potential income and employment generating opportunities, suggest that three factors should be considered for narrowing the product selection:

- Economic factors;
- Employment and human resources factors; and
- Sustainability factors.

Each of these factors has a number of variables that help define the relevance of potential agricultural products, particularly in the context of meeting the mandates of the Let's Work Program. The following section provides a brief description of the metric followed by a ranking and prioritization of the suggested agricultural products for consideration by key stakeholders.

Table 26: Economic Factor

No.	Key Variables	Issues Requiring Consideration
1	Establishment cost	<ul style="list-style-type: none"> • High establishment cost likely to limit participation by poor farmers • Limited access to affordable capital may restrict farmer participation in producing crops with high establishment cost • Lack of collateral among the poor and SMEs to access loan
2	Operating cost	<ul style="list-style-type: none"> • High operating cost likely to limit participation by poor farmers • Limited access to affordable capital may restrict farmer participation in producing crops with high operating cost • Lack of collateral among the poor and SMEs to access loan
3	Revenue per hectare	Higher revenue per hectare, particularly if labor input and technical skills requirements are low, can improve income earning potential of the poor
4	Short-term income opportunity	Particularly among the poor, short-term income generating opportunity is essential not only for improving livelihoods, but also for the sustainability of crop production
5	Medium- and long-term income opportunity	While tree crops offer high medium- and long-term income generating opportunity, poor farmers in particular require short-term income
6	Suitable for smallholder production	Products such as sugarcane can be produced by smallholder farmers, but are more suitable for large commercial operations, particularly in the context of the volume of product required for value added processing

Table 27: Employment and Skills Factors

No.	Key Variables	Issues Requiring Consideration
1	Employment per hectare (person-days/ha/year)	<ul style="list-style-type: none"> • While poor households and smallholder production generally rely on household labor force, for some labor intensive products, farmers with more than one hectare of land may be required to hire labor • Crops such as cashews and cassava require manual harvesting, which creates employment opportunities, albeit seasonal
2	Employment multiplier effect	The higher the employment multiplier effect, the larger the employment spillover effect that a product will have on the local economy

3	Technical skills requirement	<ul style="list-style-type: none"> High technical skills requirement may discourage poor farmers and smallholders from engaging in crop production High technical skills requirement in the absence of available training is likely to increase the possibility of crop failure and low yield
4	Short-term labor input requirement	<ul style="list-style-type: none"> Some products require high labor input during the initial farm establishment period, but may not require much labor input during the operational phase Some products only require limited labor input for both initial farm establishment and operation. This creates opportunities for farmers to engage in other productive income generating activities to help supplement household income
5	Medium and long-term labor input requirement	Some products such as cassava not only create employment opportunities in the short run during farming operation, but household or small scale processing is also possible which could translate into medium- and long-term employment opportunities for both household and hired labor

Table 28: Sustainability Factors

No.	Key Variables	Issues Requiring Consideration
1	Temperature suitability for production	Sufficient temperature is required for optimal plant growth, which help improve yield rate and thus income generating potential for farmers
2	Precipitation suitability for production	<ul style="list-style-type: none"> Given high cost of irrigation, crop production is most likely to be undertaken using rainfed agriculture, thus sufficient rainfall is essential for proper plant growth Some crops such as cashews require substantial amount of water during the farm establishment period. Likewise, readily available sources of water are essential to prevent plant loss and damage
3	Local downstream value added opportunity	Products such as cashew, cassava and soybean lend themselves to small-scale value added processing to help improve income generating opportunities for poor and smallholder farmers
4	Availability of anchor company in the region	Existence of anchor companies in the region is essential for securing demand for both primary and semi-processed products
5	Existing supply chain structure in the region	<ul style="list-style-type: none"> An essential element for creating employment and income generating opportunities is the existence of an efficient supply chain that helps consolidate smallholder production and links them to the market Absence of a supply chain is likely to limit demand for both primary and semi-processed products, which in turn would undermine the job creation opportunity of the product

Using the above metrics, the suggested agricultural products were ranked and prioritized. A simple, color coded ranking was used to provide a visual map of how each crop ranks relative to each other (refer to the diagram below). For economic factors, soybean was rated highest, while pigeon pea was ranked lowest. For employment and human resource factors, cashew and cassava were ranked highest, with pigeon pea and soybean rated lowest. Finally, for sustainability factors, cassava and soybean exhibited perfect scores, while pigeon pea was rated relatively low.

Given these rankings, the following agricultural products are recommended according to their relevance in meeting the mandates of the Let's Work Program (presented in order of priority):

1. Cassava;
2. Cashew (on the condition that appropriate funding or sources of income can be accessed during the first three years following planting);
3. Pigeon pea;
4. Soybean; and
5. Sugarcane.

Figure 2: Product Rating, Agricultural Products

Product Rating		Agricultural Products				
Economics Factors		Cashew	Cassava	Pigeon Pea	Soybean	Sugarcane
1	Establishment cost	●	●	●	●	●
2	Operating cost	●	●	●	●	●
3	Revenue per hectare	●	●	●	●	●
4	Short-term income opportunity	●	●	●	●	●
5	Medium-long term income opportunity	●	●	●	●	●
6	Suitable for smallholder production	●	●	●	●	●
Employment/Human Resource Factors						
1	Employment per hectare	●	●	●	●	●
2	Employment multiplier effect		●	●	●	●
3	Technical skills requirement	●	●	●	●	●
4	Short-term employment opportunity	●	●	●	●	●
5	Medium-long term employment opportunity	●	●	●	●	●
Sustainability Factors						
1	Temperature suitability for production	●	●	●	●	●
2	Rainfall suitability for production	●	●	●	●	●
3	Local downstream value added opportunity	●	●	●	●	●
4	Availability of anchor company in region	●	●	●	●	●
5	Existing supply chain structure in region	●	●	●	●	●
Overall Rating/Priority		3.5	4.4	3.1	3.0	3.0
● High		5: Highest; 1: Lowest				
● Average						
● Low						

Source: Global Development Solutions, LLC

5. Forestry

According to National Forest Inventory data (2007), natural forests cover about 54.8 million hectares (70%) of Mozambique's total land area, of which 26.9 million ha are forest with high commercial value suitable for timber production, 13.2 million ha are conservation area, and 14.7 million ha are other forest types.⁴⁹ More current estimates of forest cover range from 37% to

⁴⁹ Southern Africa's Forests and People, World Forestry Congress, FAO, 2015.

50%.⁵⁰ The sector accounts for 10% of industrial production⁵¹ and contributed USD330.3 million to the economy in 2011, approximately 2.8% of GDP.⁵² The Government receives approximately USD6 million annually in royalties on logs harvested.⁵³

Despite significant forest resources, Mozambique ranks low in global production ratings: 74th for sawnwood, 68th for roundwood and 111th for wood panels.⁵⁴ Mozambique's rankings fare better regionally, for example 12th for industrial roundwood production and 10th for sawnwood production within Africa.⁵⁵ Given the low level of transformation, the available jobs primarily are in low and semi-skilled fields, such as felling, transportation, sawmilling and basic carpentry. In general in the sector, female participation is limited. In Niassa Province for example, Chikweti Forests created 3,000 jobs (20% women), but have been reduced to 1,100, since the major labor requirement was in the initial stage of implementation for clearing, land preparation and tree planting. Other forest companies have followed similar employment patterns.

Table 29: Forestry Sector Context

Figure	Factor
70%	of land area
10%	of industrial production
2.8%	of GDP
USD6	million annual logging royalties
USD109	million wood industry exports
57%	of roundwood exported versus processed locally
90%	of sector output absorbed by domestic market
High	informal employment (est. 15,000 to 600,000)
96%	of formally registered firms are SMEs*
61%	of formal employment is SMEs*
High	unlicensed and unreported activity (est. 93% of logging and 90% of exports)

*Small and medium-size enterprises (up to-100 employees)
Compiled by Global Development Solutions, LLC

Approximately 90% of locally produced wood products are consumed locally and include school furniture, parquet, railway sleepers, wood poles for electricity networks, panels, artisanal products and building materials.⁵⁶ The quality of these products is often low by international standards, and most forest concession and simple license holders choose to export logs, mainly to China and Hong Kong, rather than processed products.⁵⁷ Much of domestic demand for processed products is met from imports, mostly from South Africa and Portugal. Imports include furniture, wood poles for electricity networks and panels.⁵⁸ For most wood products, despite local production in many categories (notably sheets for veneering/plywood/lamination, packing

⁵⁰ Estimate of 37% forest per GlobalForestWatch.org (2000 data) and defined as tree canopy density greater than 30%. Estimate of 50% national territory (40 million ha) per FAO attends launch of project aiming to increase sustainability of the timber market, <http://www.fao.org/mozambique/news/detail-events/en/c/326790/>. Estimates as high as 78% have been noted in other sources.

⁵¹ Excluding fuelwood and other timber and non-timber forest products consumed directly by the rural population and sold in the informal market. Source: John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

⁵² FAO, 2011, as cited by GlobalForestWatch.org.

⁵³ John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014

⁵⁴ FAOSTAT

⁵⁵ FAOSTAT

⁵⁶ Only one woman-owned furniture producer was identified (Yola Mobilias).

⁵⁷ John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014

⁵⁸ Ibid

crates and pallets, flooring and moldings, wood furniture and doors) Mozambique is a net importer, which indicates opportunity to scale up local secondary and tertiary processing capabilities to meet local market demand. In particular, in 2013, Mozambique imported USD76.0 million of wood furniture and chairs; USD16.3 million of wood joinery, panels, floor panels and roofing shingles; USD9.1 million of plywood, veneers and laminated panels; USD8.5 million of wood doors and frames; USD6.0 million of particle board; and USD4.9 million of packing cases, crates and pallets.⁵⁹

Wood industry exports grew from USD1.73 million in 2000 (1.2% of manufacturing and agribusiness exports) to USD108.87 million in 2011 (21.4% of manufacturing and agribusiness exports).^{60,61} Exports include roundwood, sawnwood, wood-based panels, railway sleepers, wood flooring and moldings, packing crates/pallets and furniture. Some 90% of officially recorded exports of timber go to China, via purchases by the state-owned China International Trust and Investment Corporation.⁶² Other export destinations for Mozambican timber include Hong Kong, Japan, Germany, Spain, Italy, Portugal and South Africa, and to a lesser extent, West Africa (Cameroon, Ivory Coast, Ghana, Gabon and Congo), Southeast Asia (Indonesia, Malaysia and Myanmar) and Brazil.⁶³ Mozambique exports of forestry products consist largely of industrial roundwood (74% of 2013 quantity and 66% of 2013 value as reported as imported by reporter countries), and sawnwood (21% of 2013 quantity and 31% of 2013 value as reported as imported by reporter countries), both primary processed wood products (see figure below). In the other product categories (less than 5% of total quantity and value), 74% of 2013 quantity and 66% of 2013 value consisted for exports of wood-based panels and newsprint. However, the bulk of wood-based panel exports consisted of chips, and particles as opposed to finished panel products.⁶⁴

⁵⁹ UN Comtrade

⁶⁰ Wood industry not defined. John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014.

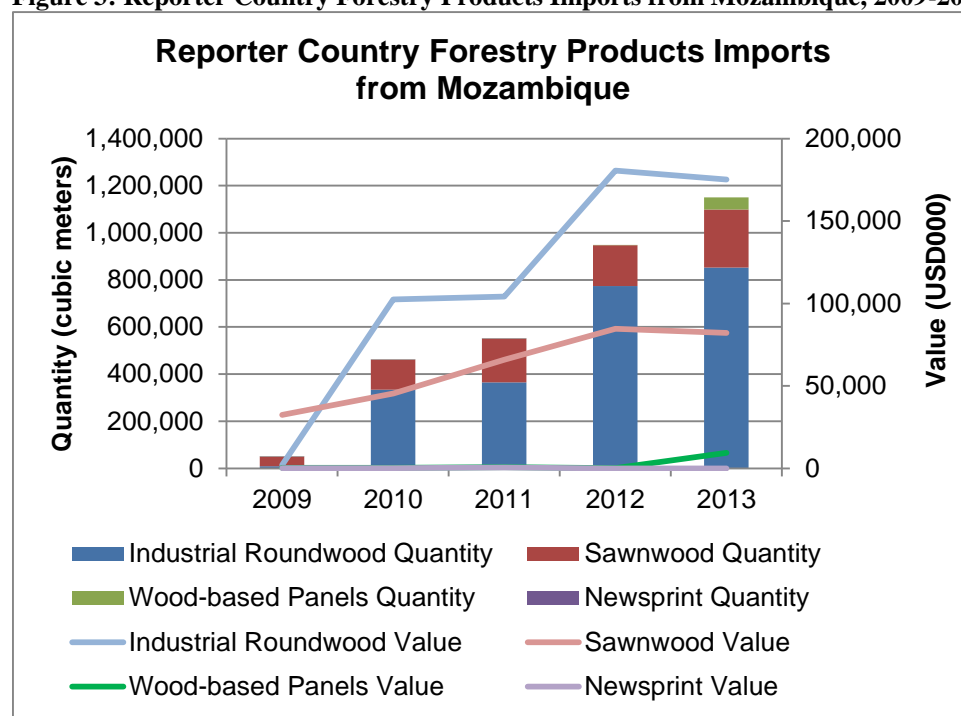
⁶¹ As with many statistics for the industry, analysis proves difficult. For example, cited exports of USD109 million and sector contribution to GDP of USD330 million imply domestic absorption of 67% not 90% as per other sources. The large informal sector and unreported wood activities contribute to such discrepancies.

⁶² Instituto de Promoção de Exportações (2003), as cited in John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014.

⁶³ John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014.

⁶⁴ More detail is provided in Annex 9.

Figure 3: Reporter Country Forestry Products Imports from Mozambique, 2009-2013



Source: Global Development Solutions, LLC, analysis of FAOSTAT data

A log export ban for major wood species has spurred sawmilling exports but as of yet has failed to produce major in-country processing; as such the sector realizes low transformation rates and high unrealized potential.⁶⁵ While globally only 7% of industrial roundwood production is exported,⁶⁶ indicating high levels of local ongoing processing before local consumption or export, Mozambique exports 57% of its industrial roundwood production, indicating minimal local value-added processing for the sector.⁶⁷

Overall, the sector faces considerable challenges and constraints related to quality, infrastructure, technical support, capacity, regulation and enforcement, as detailed in the table below. The sector has a significant level of informal and unreported activity, which poses a significant obstacle to sector analysis and development of a jobs creation program, particularly if focused at early stages in the value chain.

Table 30: Key Challenges and Constraints for Forestry and Wood Products Sector

Key Challenges	<ul style="list-style-type: none"> • Low quality of domestically-produced wood products encourages imports • Low quality of domestic processing, poor infrastructure and distance to mills and high processed wood tariffs in destination countries discourage license holders from processing locally
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⁶⁵ More detail on the regulatory environment and forest utilization can be found in Annex 5.

⁶⁶ Global Development Solutions, LLC analysis of data from FAOSTAT-Forestry database

⁶⁷ Global Development Solutions, LLC analysis of data from FAOSTAT-Forestry database (Mozambique production and import partner data, 2013)

- 
- **Limited technical support** for processing, despite legal requirement to process “first class” species prior to export and lower royalty rate for first class species (1/4 the rate of export logs)
 - **Lack of capacity** (trained staff, managerial capability, education/training in forestry technology, entrepreneurship, business management, marketing)
 - **Ineffective law enforcement** regarding unlicensed logging (est. 93% of harvest volume in 2013) affects sector sustainability, development and data accuracy for baseline improvement
 - Given the **large informal sector** for forestry, it may be difficult to differentiate between actual job growth and merely a shift from informal to formal segments
 - **Capital markets insufficient** to handle large, long-term sector investment
 - **Donor support is concentrated** around policy and administrative issues rather than in production or processing

Compiled by Global Development Solutions, LLC

Despite the challenges, there is considerable potential for growth and sustainability of the sector. Abundant availability of cut timber opens up the possibility for developing downstream value-added wood products, i.e., locally produced wood products such as furniture, windows and doors for both commercial and household use. The GoM reforestation strategy considers the goal to establish 1 million hectares of forest plantations by 2030, with potential to create 100,000 direct and indirect jobs in the sector in the next 10 years, with the number growing to 250,000 jobs by 2030, producing USD1.5 billion in exports and manufactured forest products.

5.1. Sector Structure

Due to the large informal sector, sector employment estimates vary widely, from 22,000 directly employed⁶⁸ to 600,000, with approximately 200,000 in the formal sector and 400,000 in the informal sector (excluding charcoal, fuelwood and village-based hand-sawing for timber).⁶⁹ There is significant growth potential, principally in terms of low-skilled jobs, which can occur in the felling activities, transportation, sawmilling, carpentry and others. The sector has a high concentration of small- and medium-size enterprises; one source estimated that SMEs comprise 96% of the formally registered enterprises in the sector and 61% of the formal employment (see table below). Average incomes for those engaged in primary production range from USD70 to USD192 per month, while average income for those employed in primary and secondary processing ranges from USD162 to USD250, demonstrating higher earnings potential for those adding value to the wood product (Table 31). Information on sector participants may contain overlap, for example, due to lack of coordination among institutions responsible for the sector reporting (Ministry of Land, Environment and Rural Development, Ministry of Industry and Commerce and the National Statistics institutions). In the table below, for example, some companies have the concession to exploit/log forest areas for timber and also have sawmills,

⁶⁸ FAO, as cited by GlobalForestWatch.org. Reported formal employment in the forestry sector (2011), converted to full-time equivalents (a common unit for measuring employment across various sectors). The figure does not include unreported, informal and indirect employment. According to the FAO, it is likely underestimated.

⁶⁹ John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

either in the same or separate locations, but it is not clear if they are counted as separate companies and/or locations.

Table 31: Forestry Sector Firm Classification and Size Distribution

Factor	Firm size	Forest management and exploitation		Industry of wood, cork, pulp and paper		Total Forestry	
		Number	Percent of total	Number	Percent of total	Number	Percent of total
Number of enterprises	SME	157	95%	445	96%	602	96%
	Large	9	5%	17	4%	26	4%
	Total	166	100%	462	100%	628	100%
Number of employees	SME	2,661	42%	6,619	75%	9,280	61%
	Large	3,734	58%	2,190	25%	5,924	39%
	Total	6,395	100%	8,809	100%	15,204	100%
Average monthly remuneration	SME	MZN8,686 (USD192)		MZN7,316 (USD162)		NA	NA
	Large	MZN3,168 (USD70)		MZN11,311 (USD250)		NA	NA

SME = Small and medium-size enterprise

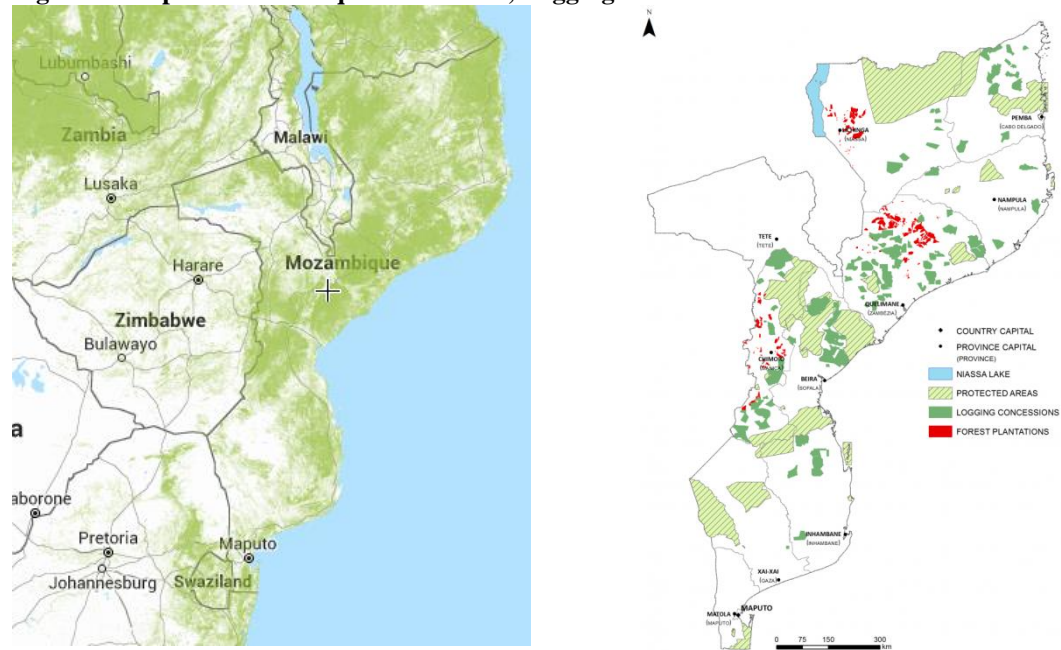
Per Mozambique labor law, company size is defined by number of employees. Micro = 0 employees, Small = 1 – 10 people, Medium-size = 11 – 100 people, Large = more than 100 people.

Source: Compiled by Global Development Solutions, LLC from INE, *Indicadores económico-financeiros das empresas 2012*

Mozambique forest and formal logging activity (concessions and plantations) is concentrated mainly in the north and center of the country (see figure below). Lands with the highest biophysical potential for forest plantations are located in Niassa, Cabo Delgado, Nampula, Zambezia, Tete and Manica.⁷⁰

⁷⁰ Assessment of the Investment Climate in the Mozambican Planted Forest Sector, UNIQUE Forestry and Land Use GmbH, May 2015.

Figure 4: Maps of Mozambique Tree Cover, Logging Concessions and Forest Plantations



Source: Hansen/UMD/Google/USGS/NASA, Global Forest Watch, 2000; Atlas Renewable Energy of Mozambique⁷¹

Formal native forest timber production in Mozambique has two main channels: forest concessions and annual simple licenses.

⁷¹ Atlas Renewable Energy of Mozambique, www.atlasrenovaveis.co.mz/en/conteudo/biomass-resource.

Table 32: Channels for Native Forest Timber Production

Channel	Term	Use	Application authority	Number active	Area covered	Share	Requirements
Forest concession	Renewable up to 50 years	<ul style="list-style-type: none"> Intensive forestry. Large-scale operators for whom forestry is the main activity. 	Varies by concession size: 0-20,000 ha: provincial governor 20,000-100,000 ha: Minister of Agriculture 100,000 ha or more: Ministerial Council	167 active	5.2 million ha (total)	35% of licensed timber volume	<ul style="list-style-type: none"> Approved management plan (92 approved concessionaires). Must install sawmill at each concession.
Simple license	Annual	<ul style="list-style-type: none"> Small operators. Rural communities and individuals seeking to extract small quantities of forest resources. Use of trees for any commercial purpose. Converting land cover from forestry to agriculture or pasture. 	Provincial level	1,000 (est.)	Up to 500 m ³ per license per year, based on mapped area	65% of licensed timber volume	<ul style="list-style-type: none"> Simple management plan

Source: John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

The major firms, which hold long-term concessions, operate a vertically integrated system, from logging to marketing. Each concession has a “licensed harvest” or volume the Government permits to be harvested nationwide in any one year. The licensee then files “registered harvests” to officially record the volume actually removed by the licensee, within the scope of the larger licensed volume. “Registered harvests” are therefore a more appropriate measure of actual legal harvests by licensed operators. Concessionaires also must have an approved management plan. Per one study, only 92 of the 167 active concessionaires had an approved management plan, while the rest were either operating informally or still undergoing the costly process of preparing their management plan.⁷² Thus a concession holder may not be actively harvesting, depending on market prices or other factors.

Holders of simple licenses primarily are small- and medium-size firms (employing up to 50 people), and rarely have log processing facilities, thus sell primarily to sawmills (directly or via intermediaries), who in turn sell directly to customers at their sites.⁷³ The intermediaries, who often finance transportation, are in many cases linked to exporters, among whom Chinese agents currently dominate.

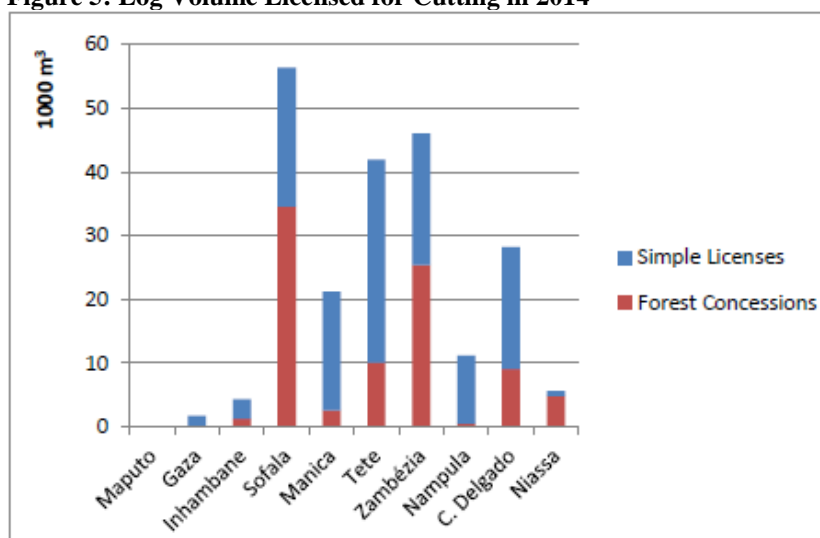
⁷² John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

⁷³ Ibid

In addition to licensed operators, many individual operators work without logging licenses to fell trees and sell them on site to intermediaries, reportedly for USD2 to USD10 per log.⁷⁴ The unlicensed sellers and their intermediaries are an important supplier of logs to local carpenters. Law enforcement in many parts of the country is ineffective regarding such activity.

As of the third quarter of 2014, the Provincial Services for Forests and Wildlife (SPFFB) issued a total of 788 licenses for cutting a total of 216,820 m³ of logs, a 2% increase from the previous year. Simple licenses account for 59% of roundwood volume, with the remainder being issued for forest concessions. The main cutting provinces are Sofala (26%), Zambezia (21%), Tete (19%), Cabo Delgado (13%) and Manica (10%) (see figure below). The Mozambican Association of Timber Operators (AMOMA) reports members across all provinces but primarily in Cabo Delgado, Manica, Sofala and Zambezia.⁷⁵

Figure 5: Log Volume Licensed for Cutting in 2014



Source: Balance of the PES (2014), as cited in Diogo Machado Mendes, Policy Note on Natural Forest Value Chains, FAO - TCI Africa, 20 November 2015

According to the official forest sector records, Mozambique has about 200 sawmills, 47% of which have subsidiary or annexed carpentries. The commercial transactions involving raw material for carpentries in urban areas, excluding sawmill annexed carpentries, were estimated to reach at least MZN2.25 billion/year (about USD75 million). Standards for local sawmilling are considered low. A USAID report from 2006 noted that a log exported from Mozambique in raw form was worth 60% more than the sawn timber produced from it, partly due to less accurate cut tolerances versus larger and more modern specialized overseas mills. Besides milling quality, other factors contributing to a lower value of exported sawn timber include: overseas sawmills make better use of offcuts and sawdust; primary processing located close to the end user which allows for a better match of cuts to users' needs; and import tariffs on logs usually are less than

⁷⁴ John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014

⁷⁵ Professional Forestry Associations in Southern Africa, African Forest Forum (AFF), Vol.1, Issue 4, 2011.

those for sawn timber.⁷⁶ The low standard of local saw-milling is in part due to the requirement that each forest concession must install its own sawmill. Reportedly, most mills installed to meet this requirement are small, old and inefficient, use less accurate labor-intensive technology and lack market focus. Investment in more sophisticated processing (kiln drying, veneer, plywood, molding, joinery and furniture) is limited.⁷⁷

The major wood processors include some relatively large furniture manufacturers, who export their output. Most processing of products for the domestic market involves units with basic carpentry equipment (e.g. lathes, multipurpose machines, parallel planes, molding lathes, etc.). Community carpenters are found in villages in every district. They use hand equipment to process sawn timber brought in by clients, informal operators or local simple license holders. Such enterprises produce furniture, doors, window frames, coffins, etc., which are sold locally.⁷⁸ At least 35,000 people are estimated to be directly employed in carpentry activities.

Besides native timber, there is significant demand for land in Mozambique for forest plantations, particularly for the use of poles, pulp and construction wood products. This movement began around 2000 and intensified from 2005, with significant foreign direct investment (e.g., Portucel, Green Resources). Plantation forests are allocated through a land rights use process (Direito do Uso e Aproveitamento da Terra, or DUAT). Target regions include Niassa and Zambezia, which have suitable agro-climatic conditions for softwood (mainly Pinus, but hardwoods such as Eucalyptus tend to perform well). Other regions considered for forest plantations include Manica, Nampula and Sofala. The plantation industry is in its early stage, with many companies still in investment or planting stages, as evidenced by the difference between the authorized area for plantations versus what is effectively planted. Attracting plantation investment has proven challenging due to the lack of understanding regarding the needs of international investors and lack of inclusive policies for land use. For example, based on survey data of available area, investors were solicited and prepared investment plans for a 50,000 ha plantation in Niassa province, only to arrive to find that only half the site was suitable, with the remainder unsuitable soil (e.g., rock) or occupied by community villages, rendering the investment infeasible.

Regulatory environment and forest utilization. The forest and wildlife law requires a management plan, regardless of land tenure, to grant the use of forest products for commercial purposes. The forest and wildlife law establishes three categories of forest use intensity; details are provided below.

⁷⁶ Ogle and Nhamumbo, USAID, 2006, as cited in John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

⁷⁷ John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

⁷⁸ Policy Note on Natural Forest Value Chains, FAO - TCI Africa, 20 November 2015.

Table 33: Categories for Forest Use Intensity

Category	Description	Use
Intensive forestry productivity	<ul style="list-style-type: none"> Areas of high forestry productivity 	<ul style="list-style-type: none"> Forest concessions Companies and individuals which have forestry as the main activity and want to explore large quantities of forest products
Medium forestry productivity	<ul style="list-style-type: none"> Areas of extensive forestry use 	<ul style="list-style-type: none"> Areas in this category can be converted for land use other than forestry Generally used for simple license Rural communities and individuals
Multiple use areas	<ul style="list-style-type: none"> Forestry is not the main activity The areas can be used for other purposes 	<ul style="list-style-type: none"> May be used for simple license Area is defined for purposes other than forestry Trees may be used for commercial purposes, especially when there is need to convert land cover from forestry to agriculture or pasture

Source: John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014; *Background to Miombo Woodlands in Mozambique*, *Miombo woodlands and HIV/AIDS interactions - Mozambique Country Report*, FAO, 2005

The forest and wildlife law also establishes three categories of protected area, as noted below.

Table 34: Categories of Protected Area

Category	Purpose and Use	Management	Examples
National parks	<ul style="list-style-type: none"> Designed purely for nature and wildlife protection No resources may be extracted No settlements are allowed 	<ul style="list-style-type: none"> Department of Conservation Areas of the Ministry of Tourism 	<ul style="list-style-type: none"> Gorongosa National Park Zinave National Park
National reserves	<ul style="list-style-type: none"> Game and forest reserves Human settlements and resources extraction may be allowed, but restricted by the rules set by the conservation plan Provide timber to state agencies for construction or furniture Provide for protection of water catchments Usually no formal management plan Some agriculture use by local communities May be used for simple license 	<ul style="list-style-type: none"> Department of Forestry and Wildlife of the Ministry of Agriculture and Rural Development May be co-managed by other organizations including local communities and NGOs 	<ul style="list-style-type: none"> Niassa Reserve, one of the largest areas established for protection of elephants 13 forest reserves classified within this category. Licuáti, Mecuburi, Derre and Matibane forest reserves: timber to state agencies either for building purposes or for furniture Moribane, Maronga, Zomba and Mpalwe forest reserves: protection of water catchments Mecubúri and Moribane forest reserves: local community agriculture Licuáti forest reserve: timber poaching

Category	Purpose and Use	Management	Examples
Community conservation areas	<ul style="list-style-type: none"> • Areas with local or cultural interest • Traditional leaders' agricultural harvesting and rain ceremonies • May be used for simple license 	<ul style="list-style-type: none"> • Local or district authorities • Ruled by local beliefs and myths • Access granted by traditional leaders and, in general, rules are strictly followed 	<ul style="list-style-type: none"> • Chirindzene forest: sacred areas which can provide medicinal plants and other goods for local communities

Source: Background to Miombo Woodlands in Mozambique, Miombo woodlands and HIV/AIDS interactions - Mozambique Country Report, FAO, 2005

The most extensive forest type, called Miombo Forest, occupies two-thirds of Mozambique, including vast areas in the central and northern regions.⁷⁹ The second most extensive forest type is Mopane Forest, occurring primarily in the Limpopo-Save area and upper Zambezi Valley. Generally, the forests of the north are denser and less exploited than those of the south.⁸⁰ Details on the characteristics of the forest types and tree species can be found in the Annex. Tree species surveys have found that Cabo Delgado province in the north has a larger variety of trees compared to other provinces (e.g., Manica, Niassa, Sofala).⁸¹

From the 118 tree species identified in Mozambique as having commercial possibilities, 33 species have some commercial potential in the market. Most of the exploited species are classified as “precious” or “first class.” Four species account for the bulk of demand from both the construction sector and the furniture sector: Umbila (*Pterocarpus angolensis*), Jambire (*Millethia stuhlmannii*), Chanfuta (*Azalia quanzensis*) and Umbaua (*Khaya nyasica*). Woodcrafts and carvings commonly are made of *Dalbergia melanoxylon* and *Spirostachys africana*.⁸²

Timber species are classified according to their commercial or scientific value, rarity, use, girth and quality. Classifications include precious, first class, second class, third class and fourth class (also known as Class 1, Class 2, etc., respectively), as listed officially in the regulation: *DNFFB 2002b. Regulamento da Lei de Florestas e Fauna Bravia. Decreto 12/2002 de 6 de Junho. Maputo, Moçambique*.⁸³ In practice, the classification system is highly related to the timber market demand, so that highly demanded species are classified precious or first class, and classification of species can shift from time to time. The classification influences pricing and dictates processing requirements, as noted in the table below. Per Decree No 12/2002, also known as “the log export ban,” first class species must be processed in Mozambique prior to

⁷⁹ An Overview of the Problems Faced by Mozambique's Forests, Forest-Dependent Peoples and Forest Workers, World Rainforest Movement.

http://www.wrm.org.uy/oldsite/countries/Africaspeaks/Overview_problems_Mozambique_forests.pdf

⁸⁰ Ibid http://www.wrm.org.uy/oldsite/countries/Africaspeaks/Overview_problems_Mozambique_forests.pdf

⁸¹ Background to Miombo Woodlands in Mozambique, FAO

⁸² Ibid

⁸³ Classes 2 through 4 also are known as “secondary timber species.”

export, but logs of precious species can be exported without processing.⁸⁴ By requiring in-country processing, the log export ban was designed to add value to forest products, create jobs and decrease export of logs. However, it has been reported that most sawmills in Cabo Delgado produce mainly wooden planks, which are not labor intensive and add little value to the exported material.⁸⁵ Further, wastage rates reportedly are high (up to 50%). As such, the full benefits of value added processing have yet to be realized.

Table 35: Timber Species Classification, Logging Tax and Use

Classification	Precious	Class 1	Class 2	Class 3	Class 4
Logging tax (USD/m³)	80	20	12	8	4
Export limitation	No local processing requirement	In-country processing required	No local processing requirement	No local processing requirement	No local processing requirement
Primary market	domestic and international	domestic and international	domestic	domestic	domestic

Source: Background to Miombo Woodlands in Mozambique, FAO

Besides requiring in-country processing of Class 1 species, Decree No 12/2002 also stipulates that 20% of the value of access, exploitation and utilization fees of forest products should be channeled to local communities, and that 50% of the value of fines derived from transgression of the forest and wildlife law shall be attributed to local law enforcement officials, community agents and local communities involved in the exposure.⁸⁶ The 20% tax channeled to communities has a potential to create indirect jobs, depending on how the communities apply this amount. Possible areas could be in agricultural intensification, ecotourism, rural infrastructures construction and others. The rural areas are the main focus, because the wood industries (or part of them) operate in these areas, creating capacity to generate employment to local people (direct or indirectly).

In practice, the decree has led to underreporting of volumes in order to reduce fees, false registration of cargo and wood species in order to avoid local processing requirements, export of raw logs of first class wood species, and minimal processing, e.g., export of planks bigger than the legal size of 10 cm thick. Chinese exporters dominate the market and prefer to export raw logs because China imposes low taxes on raw logs, but significant taxes on processed woods. Some stakeholders contend that the taxes in China are the main reason for the interest in raw logs, and not the high inefficiency of the processing mills (around 50%) in Mozambique, because the losses are borne by the processing mills and not by the Asian buyers, who pay for final product volume.

⁸⁴ A. Ogle and I. Nhantumbo, Improving the Competitiveness of the Timber and Wood Sector in Mozambique, USAID, 2006, as cited in John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

⁸⁵ Forests and the Biodiversity Convention; Independent Monitoring of the Implementation of the Expanded Programme of Work in Mozambique, Global Forest Coalition, May 2008, <http://www.globalforestcoalition.org/wp-content/uploads/2010/08/IM-Report-Mozambique.pdf>

⁸⁶ An Overview of the Problems Faced by Mozambique's Forests, Forest-Dependent Peoples and Forest Workers, http://www.wrm.org.uy/oldsite/countries/Africaspeaks/Overview_problems_Mozambique_forests.pdf

Total logging consumption was estimated at 956,540 m³ in 2013, of which 434,953 m³ (45.5%) was estimated to be consumed locally and 521,587 (54.5%) estimated to be exported, based on global reported imports from Mozambique. Unreported partner trade is not included in the utilization figures. Throughout 2007 to 2013, actual consumption exceeded both registered harvest volume (the amount actually extracted and reported by licensed parties) and licensed harvests volume (the amount permitted to be extracted per license).

Table 36: Mozambique Forestry Utilization

Metric	Unit	2007	2008	2009	2010	2011	2012	2013	Change 2007-2013	Percent of 2013 total
Actual consumption	m3	535,818	550,016	538,823	723,717	797,647	884,140	956,540	78.5%	100.0%
Registered harvests	m3	128,354	124,867	112,584	167,955	175,871	178,210	66,320	20.2%	6.9%
Licensed harvests	m3	197,133	166,781	162,954	244,156	270,825	321,370	212,711	36.3%	22.2%
Licensed exports	m3	86,912	103,087	114,178	199,418	211,995	260,385	280,796	29.5%	29.4%
Global reported imports	m3	219,783	216,763	187,223	352,562	405,643	469,899	521,587	53.1%	54.5%
Domestic consumption	m3	316,035	333,254	351,600	371,155	392,004	414,241	434,953	46.9%	45.5%

Source: *First Class Crisis: China's Criminal and Unsustainable Intervention in Mozambique's Miombo Forests*, Environmental Investigation Agency, July 2014.

Illegal logging and timber smuggling pose one of the most serious problems in the industry. One way of estimating the scale of the problem is to compare official export figures with other countries' import figures. For example, China reported imports of 516,296 m³ from Mozambique in 2013, but total licensed exports from Mozambique in 2013 were only 280,796 m³.⁸⁷ According to the Environmental Investigation Agency (EIA), 93% of all logging (i.e., unlicensed and unregistered) in Mozambique was illegal in 2013.⁸⁸

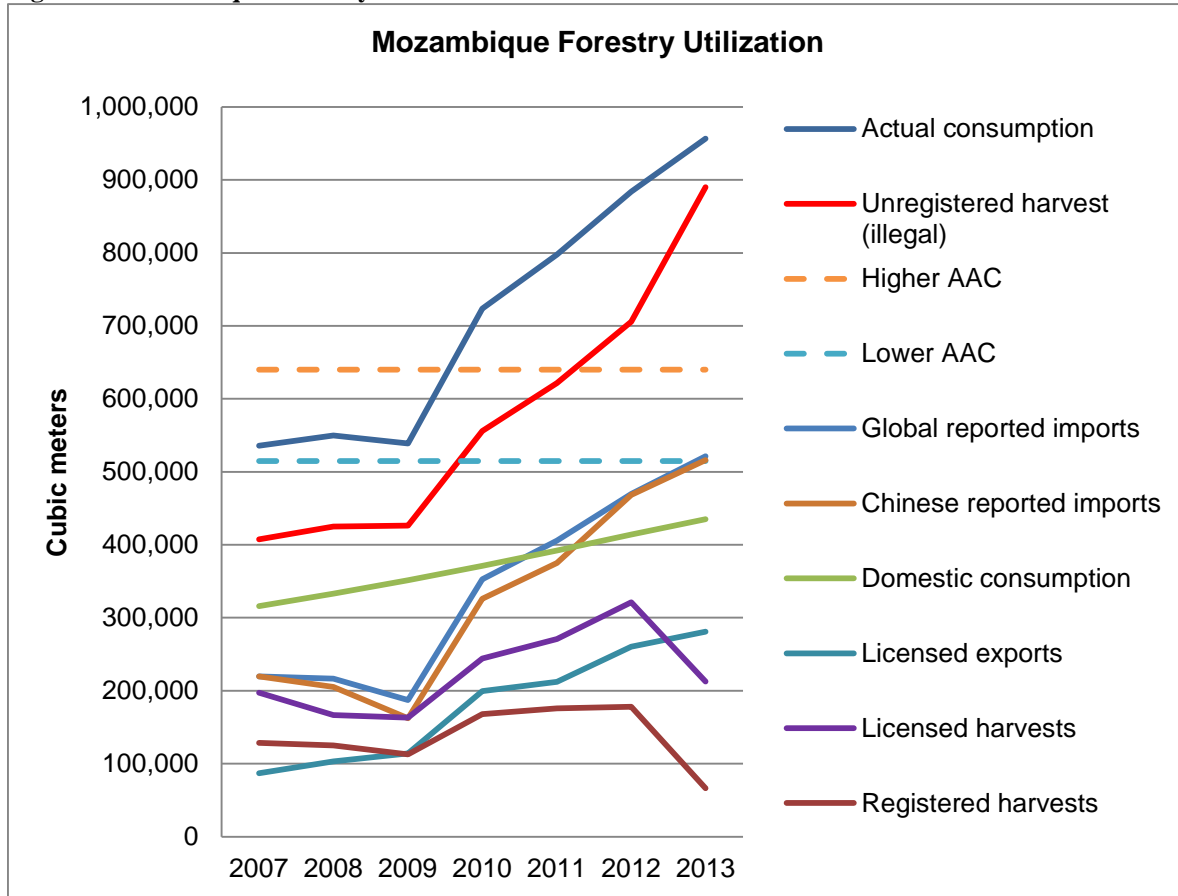
The Government sets lower and upper boundaries (annual allowable cut, or AAC) for the sustainable harvests of commercial timber, beyond which survival of forests and commercial species are threatened. Since 2010, total consumption (registered and estimated illegal) has exceeded the higher AAC, and in 2011, illegal harvest surpassed the higher AAC, critically threatening the sustainability of the sector while also foregoing valuable potential tax revenue that could be directed toward sector protection and development (see figure below and data in Annex 10).⁸⁹

⁸⁷ First Class Crisis: China's Criminal and Unsustainable Intervention in Mozambique's Miombo Forests, Environmental Investigation Agency, July 2014, <https://eia-international.org/wp-content/uploads/First-Class-Crisis-English-FINAL.pdf>

⁸⁸ Ibid

⁸⁹ Ibid

Figure 6: Mozambique Forestry Utilization



Source: *First Class Crisis: China's Criminal and Unsustainable Intervention in Mozambique's Miombo Forests*, Environmental Investigation Agency, July 2014

There is potential for the improvement of local companies' outputs by implementing new technologies, with focus on transformation of logs into sawn wood, which would increase the market value principally for exports. Difficulties in the processing step of the value chain result in loss of revenues. GDS estimated that up to USD6.4 million of revenue is lost every year due to bad or non-existent wood processing. Improved sector compliance could enhance funding for sector development. An estimated 40% to 60% of timber is not declared for exports, meaning exported illegally. It is estimated that the additional tax revenue that should be collected from logging permits related to unlicensed (therefore illegal) wood ranged from about MZN154 - 304 million (USD6.4 - 11.3 million) from 2007 to 2011. Suggestions to tackle illegal activities in this sector were put forth under the umbrella of the Forest Law Enforcement, Governance and Trade Support Programme for African, Caribbean and Pacific Countries (GCP/INT/064/EC).

5.2. Forestry Value Chain

A preliminary value chain map of the sector is provided below. The map depicts the path for value addition generally, as wood moves from forest or plantation to primary product (log or roundwood), processing (primary, secondary, and tertiary, as applicable), and trader or buyer

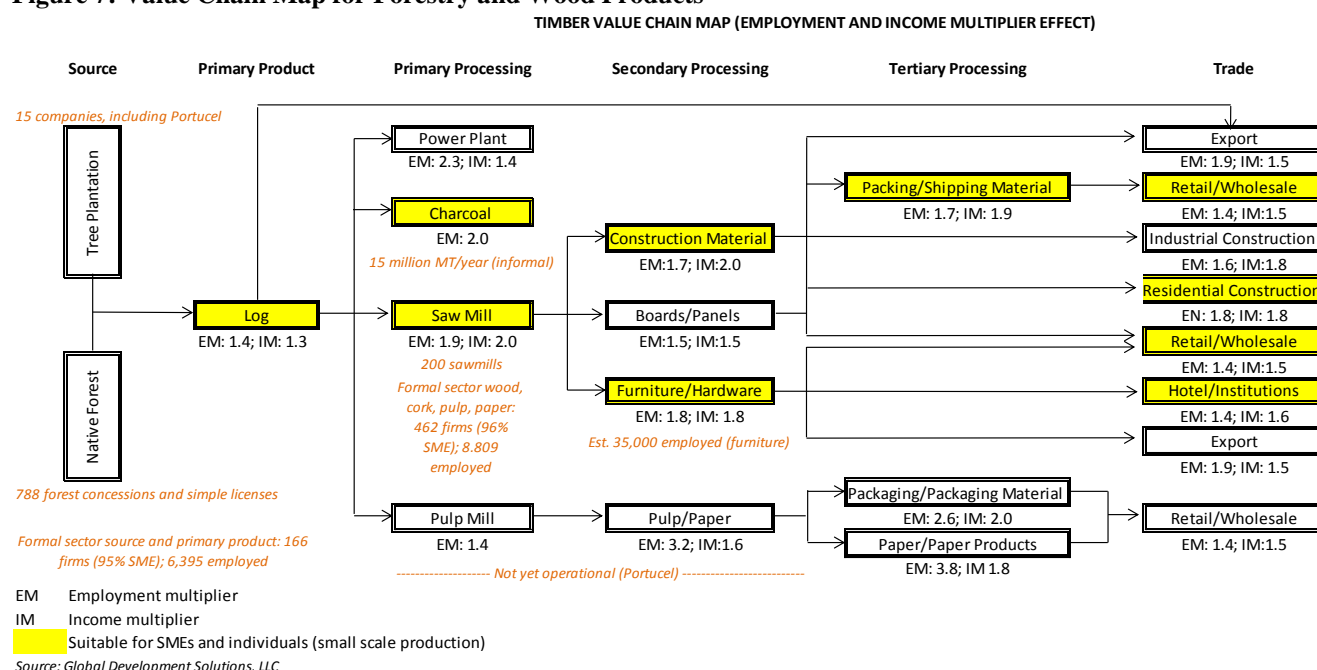
(local and export). Pathways suitable for small scale production (in addition to large scale commercial activity) are highlighted in order to illustrate where smallholders and rural poor may best enter or participate in the value chain.

The maps also indicate employment and income potential in the form of employment multiplier (EM) and income multiplier (IM) ratios. The multipliers indicate potential indirect and induced effects of direct jobs and wages in the sector. For example, an employment multiplier of 1.9 for saw mill, indicates that for every direct job in saw mill operations, 1.9 other jobs are created; in such an example, if a sawmill hires 100 people, such hiring will result in 190 jobs in the local economy, or 290 total new jobs. Generally, products with a higher multiplier are more desirable, since they can be expected to generate greater job creation or income impact. See Annex 3 for more detail regarding multipliers.

Table 37: Employment Multiplier Example

Factor	Figure
Employment multiplier	1.9
Job creation	
Direct hire	100
Indirect and induced	190
Total	290

Figure 7: Value Chain Map for Forestry and Wood Products



Preliminary data indicate that timber is sourced from natural forests (788 concessions and simple licenses) or plantations (15 in process⁹⁰). Harvesting or felling results in the primary product (log), which can then be exported as roundwood or locally processed. Current processing includes sawmilling or charcoal making (est. 15 million MT/year, informal). Significant pulp milling is not expected to come on line until 2025. From the saw mill, the wood product (board

⁹⁰ Further consolidation among plantation holders indicates that actual companies operating in plantation forestation and reforestation may be 11, with primary holders as Portucel, Rift Valley and Green Resources; to be confirmed during field survey.

or plank) can be used or exported as plank, or further processed into panels, construction material, furniture or other products. Some firms are vertically integrated so perform multiple activities, for example, sourcing (forest concession), sawmilling and furniture making. Of the estimated 462 firms in the formal wood processing sector, 96% are SMEs. An estimated 35,000 are employed in the furniture sector (direct and informal).





5.3. Recommended Products/Sector for Consideration


Among the several potential sector value chain paths illustrated in the value chain map (Figure 7above), the project considered a number of primary and processed products. Though primary processed products such as industrial roundwood and sawnwood currently dominate the industry, such products provide little added value. There may be greater potential for added value, capacity development and SME-driven job growth through secondary processed products, such as furniture, flooring, and doors/window frames. Pulp for paper also has potential and planned growth, but current production levels are non-existent, thus precluding value chain analysis.

5.3.1. Plantation

When comparing plantations and native timber, more legitimate and sustainable job opportunities may be in plantation, as recent plantations are developed with greater oversight than has been applied to native timber extraction. Plantation establishment indicates good employment opportunities, but plantation management requires limited workers. As indicated in the figure below, plantation establishment requires 70 to 400 person-days per hectare, but only 9 to 13 for ongoing plantation management. Depending on tree type, harvest may employ 12 person-days per hectare.

Figure 8: Key Product Indicators: Plantation Establishment and Management

Key Indicators	Man-days/ha	Costs (USD/ha)*
Plantation Establishment (1)		\$ 474
Afforestation of grassland 	70	
Planting on moist forest site 	200	
Planting on steep terrain 	400	
Plantation Management (1)		\$ 171
Savanna/grassland plantation 	9	
Plantation on rain-forest site	11	
Plantation on steep terrain	13	

	Year 2	
Tree harvest rate (manual: chainsaw)	Trees/day (2)	
	12	
Harvest (man-days/ha)	Teak	Hardwoods
	12.5	137.5
No. of trees/ha after thinning, harvest ready	Teak	Hardwoods
	150	800 - 2,500
Employment multiplier (3)	1.5	
Revenue (USD/ha): year 10	\$ 3,556	

Teak requires only few days/ha required to harvest after extensive thinning

Global employment multiplier for timber harvest

(1) Plantation forestry in the tropics, J. Evans. Oxford Science Publications, 2002.

(2) Average tree size 6.0 m³, in plantation forests
Productivity and cost modeling for tree harvesting operations using chainsaws in plantation forests, Tanzania, D.S.A. Silayo, G. Mugunga.
International Journal of Engineering and Technology, 3(4) (2014) 464-472, 2014.

(3) The economic contribution of Indonesia's Forest-based Industries, ITS Global, 2011.

* Based on Eucalypts plantation in India. <http://www.fao.org/docrep/ARTICLE/WFC/XII/0634-C2.HTM>

Data shown represents global benchmarking and may vary for local production.

Source: Global Development Solutions, LLC

Perhaps more relevant is the number of potential jobs to be created as trees from the plantations are matured and ready for pulping. A large majority of plantations are planted with fast growing species appropriate for pulping, and such plantations are anticipated to generate a substantial number of wood processing jobs. For example, an efficient pulp and paper mill in an industrialized country would generate approximately 2.8 jobs for every 1,000 MT of paper and paperboard, while a less efficient plant in a developing country would require as many as 93.8 workers for every 1,000 MT of paper and paperboard.⁹¹

5.3.2. Wood Furniture

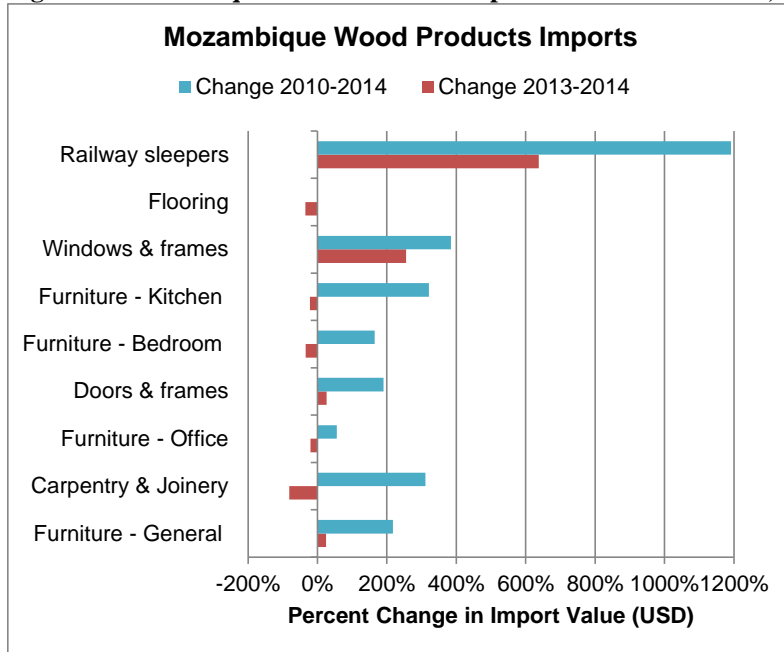
As indicated above, 90% of locally produced wood products are consumed locally, partly due to the low quality of the products and that most are not yet appropriate for export markets. At the same time, however, the demand for locally produced products in the form of windows and doors, for example is extremely high due to the overall shortage of housing (an estimated housing deficit of 2 million homes), and high demand for housing from the oil and gas sector (approximately 10,000 homes) in the northern region.

Wood product usage for various Mozambique wood species is provided in Annex 2. Notably, furniture is made from at least 26 different species of wood, across the spectrum of wood species classifications. Major export markets pay USD2.08-4.09/kg for furniture of the same species. Housing construction utilizes species across precious through class 3. Doors, windows and frames for both are made from species including Chanfuta (class 1), Sumauma (class 2) and Messasa (class 2) and command on average USD3.12/kg (doors and frames) and USD6.32/kg (windows and frames) from the species. Messinge (class 2) is commonly used for firewood and charcoal in Mozambique, but also is used for furniture, turned objects and housing construction. Thus while the global market does differentiate price by species, the local market does not exhibit product and price segmentation.

Local Market. For most wood products, despite local production in many categories (notably sheets for veneering/plywood/lamination, packing crates and pallets, flooring and moldings, wood furniture and doors) Mozambique is a net importer, which indicates opportunity to scale up local production capabilities to meet local market demand. By value, the largest Mozambique import wood product categories in 2014 were general furniture (USD17.4 million), carpentry and joinery (USD11.6 million) and doors and frames (USD5.4 million) (see Annex 3). Growth categories for local market demand (based on near- and medium-term change in import value) include railway sleepers, windows and frames, doors and frames and general furniture (see figure below and Annex 4).

⁹¹ First example is from paper mills operating in Austria and the second is from Bangladesh. Source: <http://www.ilocis.org/documents/chpt72e.htm>

Figure 9: Mozambique Wood Products Import Value Growth Rate, 2010-2014



Source: UN Comtrade

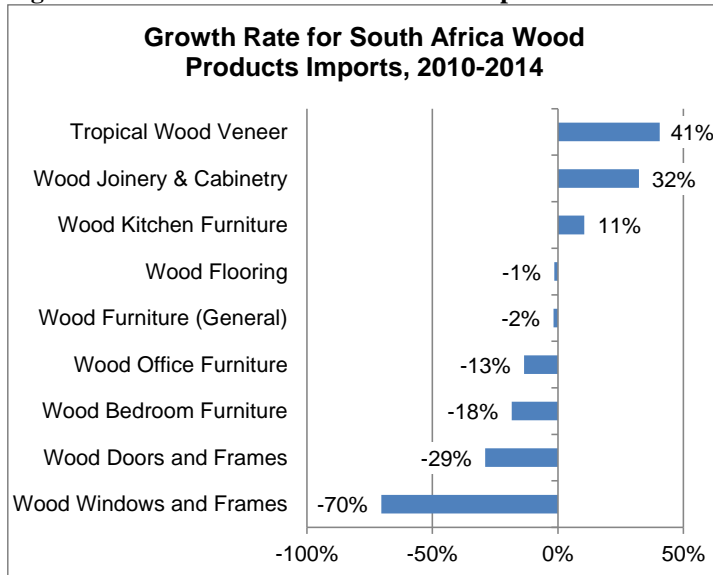
Regional Export Markets. Assuming development of local production capabilities and skills, Mozambique has the opportunity to develop export markets to meet the growing demand for global wood products. Global import data for value added wood products provides an indication of export market potential for Mozambique. Import market trends for various wood products and regions are noted in Annex 5. In 2014, South Africa imported USD79.1 million of wood furniture (general), USD27.7 million of wood joinery and cabinetry and USD26.4 million of wood bedroom furniture. Additionally, South Africa imports of tropical wood veneer, wood joinery and cabinetry and wood kitchen furniture exhibited the strongest growth (41%, 32% and 11%, respectively) during 2010-2014 (see figures below). These product categories may offer the strongest regional export opportunities for Mozambique.

Figure 10: South Africa Wood Products Import Value, 2010-2014



Source: UN Comtrade

Figure 11: South Africa Wood Products Import Value Growth Rate, 2010-2014



Source: UN Comtrade

Global Export Markets. Further afield, major industrialized markets such as EU28, USA and Japan offer opportunity for Mozambique wood products exports. EU28 offers export opportunity for furniture (general, office, bedroom and kitchen) as well as carpentry and joinery; USA has high demand for furniture (general and kitchen), carpentry and joinery, flooring, doors and frames and windows and frames; while Japan is a potentially attractive market for tropical wood veneer and office furniture (see table below and Annex 5).

Table 38: Major Markets for Wood Products Imports, 2010-2014

	Wood Product	EU28	USA	Japan
1.0	Veneer, tropical wood			X
2.0	Carvings			
3.0	Furniture			
3.1	General	X	X	
3.2	Office	X		X
3.3	Bedroom	X		
3.4	Kitchen	X	X	
4.0	Turned objects			
5.0	Specialty wood items			
6.0	Carpentry & Joinery	X	X	
7.0	Panels			
8.0	Musical instruments			
9.0	Flooring		X	
10.0	Interior trim			
11.0	Doors & frames		X	
12.0	Windows & frames		X	

Source: UN Comtrade

However, a key to targeting the major wood products markets (e.g., EU and USA) is demonstration of responsible sourcing. Such affirmation is both preferred by consumers and in many cases required by governments. Consumers are increasingly becoming environmentally conscious and demanding products that are environmentally-friendly, organic, fair trade or have other 'green' characteristics. Research indicates that consumers are willing to pay a premium of 15%-20% for products with Forest Stewardship Council (FSC) or other certification.⁹²

Beyond consumers, many governments (including, but not limited to, the EU and USA) require certification and proof of wood origin to ensure that it was sustainably harvested. For USA, wood products must comply with The Lacey Act (effective 2010), which requires wood products to demonstrate the product imported into the USA is of legal logging origin. Among other regulations, exporters to the EU must comply with the EU Forest Law Enforcement, Governance and Trade (FLEGT) action plan (2003); the EU Due Diligence Regulation (effective 2012); and the EU Timber Regulation (EUTR) (effective 2013), are initiatives to improve governance and reduce illegal logging by strengthening sustainable and legal forest management.⁹³

As a result of these developments, many wood processing firms throughout the world increasingly are implementing chain of custody supply chain management policies to avoid sanctions and to safeguard their prestige. Certification agencies, such as FSC, provide forest management certification and chain of custody certification to prove that timber and other forest products come from sustainably managed forests. Forest management (FM) certification shows

⁹² Steve Pociask and Joseph Pl Fuhr, Jr., The Monopolization of Forest Certification: Do Disparate Standards Increase Consumer Costs and Undermine Sustainability?, The American Consumer Institute Center for Citizen Research, 1 Oct 2012.

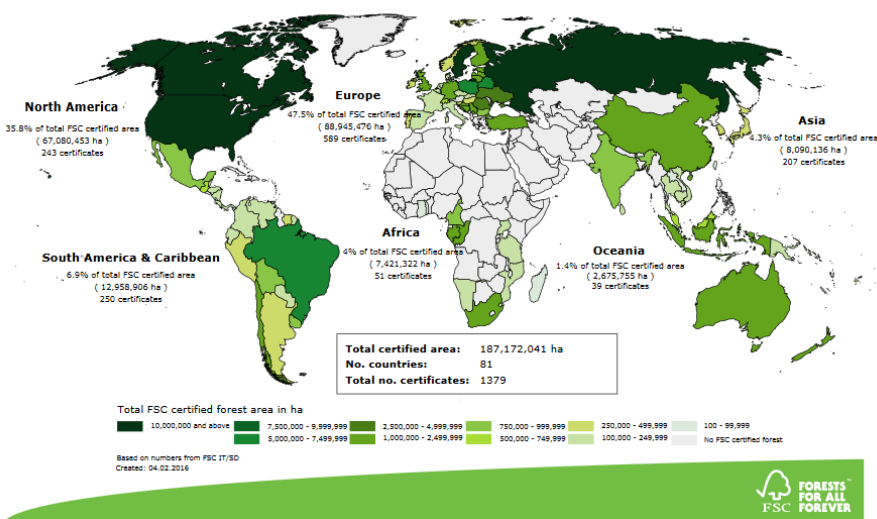
⁹³ Diversifying Sources of Growth and Competitiveness in Gabon: Agriculture, Wood Processing and Tourism, Global Development Solutions, LLC, June 2013

that forest managers (or owners) are managing their forests in a responsible way. It sets the standards for responsible management of natural and plantation forests. Certification audits verify that the forest management is in compliance with these standards. Chain of custody (CoC) certification applies to those (mainly companies) who process, trade or manufacture FSC-certified wood or derived materials. It tracks the products from forest to shelf, keeping FSC-certified wood and products separate from uncertified materials and products, thus ensuring the value of certification throughout the value chain to the customer.⁹⁴

As of June 2015, the FSC has certified more than 184 million hectares of forest area in 80 countries (see figure below), issued 1,337 forest management certificates in 80 countries and issued 29,089 chain of custody certificates in 112 countries.⁹⁵ As of March 14, 2016, the only Mozambican member of FSC was Niassa Green Resources, S.A. (formerly Malonda Tree Farms, SA).⁹⁶

Figure 12: Global Forest Stewardship Council Certified Forest Area by Region

Global FSC certified forest area



Source: Forest Stewardship Council

Areas and companies that are certified have a significant comparative advantage given the increasing concern with origin certification globally. As noted in the table below, other African countries such as South Africa, DR Congo, Cameroon and Gabon currently are better positioned than Mozambique with respect to forest management certification area, while South Africa, Egypt, Cameroon and Gabon lead the region in chain of custody certifications required for targeting industrialized export markets.

⁹⁴ Besides the FSC, there are more than 50 certification standard groups worldwide (e.g., American Tree Farm System (ATFS), Canadian Standards Association (CSA), Programme for the Endorsement of Forest Certification (PEFC) and Sustainable Forestry Initiative (SFI)); however, FSC currently is the largest globally.

⁹⁵ Market Info Pack 2015, Forest Stewardship Council, June 2015, <https://ic.fsc.org/preview.2015-fsc-market-info-pack.a-5067.pdf>

⁹⁶ Forest Stewardship Council A.C. Member List.

Table 39: FSC Forest Management and Chain of Custody Certificates Issued in Africa

Country	Total certified area (ha)*	Number of FM and FM/COC certificates*	Number of COC certificates
Cameroon	940,945	4	12
Congo, the Republic of	2,443,176	3	2
Egypt	-	-	16
Gabon	2,062,494	3	11
Ghana	3,367	1	5
Madagascar	1,298	1	1
Morocco	-	-	5
Mozambique	57,088	3	1
Namibia	156,488	4	3
Seychelles	-	-	1
South Africa	1,449,967	22	105
Swaziland	124,794	4	-
Tanzania	142,731	3	1
Tunisia	-	-	5
Uganda	38,974	3	-
Total Africa	7,421,322	51	168

* FSC certified area includes FM as well as FM/COC certificates.

FM = Forest Management

COC = Chain of Custody

FM/COC = Forest Management/Chain of Custody (joint certificate)

Source: FSC Facts and Figures, Forest Stewardship Council, 4 February 2016.

Other emerging trends for supply chain verification include DNA testing to pinpoint wood origin. Such testing can be a better guarantee of proof-of-origin than papers, which can be faked, as it can show that a wood product assembled in one country comes from a specific and legitimate stump in another country. Testing prices vary by quantity and species and cost around USD250 to test USD45,000 worth of merbau (a species of tropical wood).⁹⁷ Species mapping is expected to expand, and the cost of testing will fall as adoption rates rise. U.S. wood buyers in particular are likely to embrace the testing since, under The Lacey Act, they can be legally liable even if they did not know their wood was illegally sourced.

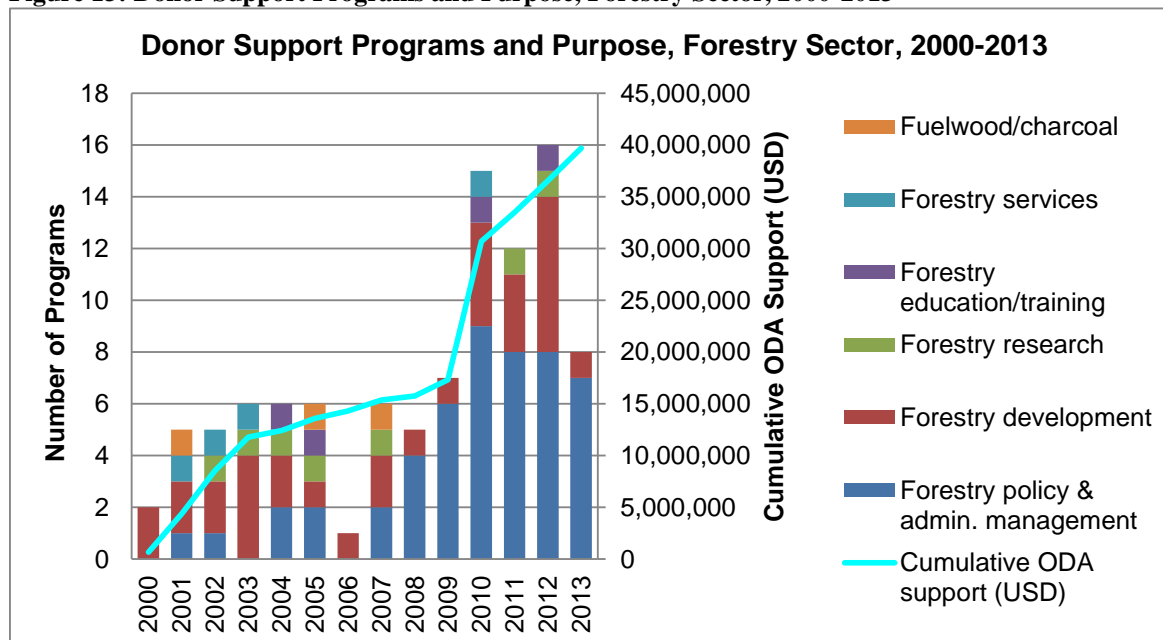
5.4 Donor Support

Donor support is concentrated largely around policy and administrative issues rather than in production or value added processing. According to Open Aid Data, from 2000 to 2013, USD39.2 million has been granted as Official Development Assistance (ODA) to the forestry sector, across 100 programs, with accelerated support in recent years. Among the identified programs, 50% are for forestry policy and administration management, and 32% for forestry

⁹⁷ Seeing the Wood for the Trees, The Economist, 22 September 2012

development. Only 4% (4 programs) was dedicated to forestry education and training.⁹⁸ Additional details regarding donor support is provided in Annex 11.

Figure 13: Donor Support Programs and Purpose, Forestry Sector, 2000-2013



Source: Open Aid Data

5.5 Potential Anchor Firms

Major firms operating in the forestry sector are noted in the table below. The 26 firms identified have the potential to provide consistent, assured demand, market linkage and direct and indirect sector employment. At least 17 of the 26 firms began plantation operations in recent years, so are not yet harvesting and processing.

As noted in the table, one of the firms (Yola Mobiliias, furniture producer) is female-owned. In general in the sector, female participation is limited. In Niassa Province for example, Chikweti Forests created 3,000 jobs (20% women), which are now reduced to 1,100, as the major labor requirement was in the initial stage of implementation for clearing, preparing and planting the land. Other forest companies have followed similar employment patterns.

⁹⁸ Open Aid Data, <http://www.openaiddata.org/purpose/259/312/top/>

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Study Design Report
Volume 1: Product Selection and Background*

Table 40: Potential Anchor Firms for Timber and Wood Products

	Firm	Sourcing	Market	Other notes
1	Companhia de Madeiras de Mocambique	Own concession and purchase	Primarily export	One of the largest timber exporters. Privately held (foreign partners from RSA). 37 permanent and 113 part time workers. Head office in Beira. Concessions in Sofala and Manica provinces. Harvests hardwoods and contracts with local sawmills to produce timber for Continental Timbers (RSA). Produces railway sleepers for RSA and Zimbabwe mines. Also makes school desks for local USD350,000 exports in 2012.
2	TCT Industrias Florestais Lda - Mobiliarias Dalmann	Own concession and purchase	Domestic (97%), export (3%)	Forest concessionaire (Catapu) and luxury wood furniture manufacturer (Beira), also wood housing and bee hives. Uses own and purchased planks. 258 employees (80 in furniture). Sales of USD1.9 million in 2010/11. Operates tourism, training school and game farm in the concession facility.
3	L Duarte Dos Santos Lda	Purchase	NA	120 employees. Sales of USD2.5 million. Produce office, hospital and school furniture; modular kitchens; metal structures. Source wood from Nampula province. Import pressed wood and accessories from China and RSA.
4	Moflor	Own concession	Domestic and export	Forestry management and industrial processing of wood. Manages 3,000 ha of eucalyptus in Manica Province. Processing unit in Dondo, Sofala province. Produces and markets eucalyptus products (Grandis/Saligna and Cloeziana species) to be used in electricity networks, telephone networks and other uses. Also produces stakes made from eucalyptus trees with various applications in the construction industry, fencing and agriculture. Railway sleepers. Wood-based construction materials. Poles and stakes are produced for the domestic market. Established in 1964. Part of Entrepoteo Group. Processing units focus on production of sleepers for railways and poles for utility networks. 300 employees.
5	Ilfoma - Industrias Florestais de Manica	Own concession	NA	3 plantations (Penhalonga, Bandula and Rotanda), 1 sawmill, 1 pole treatment plant, 1 particle-board plant (processing in Messica), 1 warehouse (Maputo). 702 employees (2011). Privatized by GoM in 2004. 80% Komatiland (RSA) and 20% GoM owned. Softwood (mainly eucalyptus and pine). Main products are poles for electricity transport and timber for construction. Total landholding is 23,600 ha of which 16,618 ha is plantable for commercial forestry.
6	Yola Mobiliarias, Lda	Purchase	Domestic (export in future)	Female founder. Specializes in production of wood-based house and office furniture. 90% of materials sourced domestically.
7	Serful, Lda	Purchase	NA	Based in Maputo. Specializes in wood processing and manufacture of coffins, cases, doors, windows, door/window frames and wood-based furniture. 50 employees.
8	Colosso, Lda	Own concession	Domestic and export	Forestry concession and wood processing factory in Zambezia. Operates in Zambezia and Maputo provinces. Specializes in production of parquet and wood contours.
9	Inchope Madeiras	NA	Export (EU, USA, Asia)	Based in Manica province. Exports hardwood logs, saw timber and planks.
10	Timberworld, Lda	Own concession	NA	Offices in Maputo and Nampula. Manufactures wood products, cork products and straw and plaiting materials. Two forest concessions in Zambezia province (23,000 ha).
11	OLAM	Own concession	Export	Holds 2 forest concessions in Zambezia province (65,000 ha). Involved in wood processing, primarily for export to China.
12	Ervendas Comercial	NA	NA	Operates in Maputo. Specializes in industrial production of parquet. At full capacity, production is about 300 sq meters of parquet/week.
13	Portucel Mocambique	Own plantation	NA	Started forest operations in 2014. Part of Portuguese paper manufacturer SOPROPEL. Receiving for first phase a USD2.3 billion investment by IFC to establish forest plantations in Mozambique. Agreement with IFC "will provide an initial investment of \$32 million to Portucel to support the pilot phase of an industrial scale monoculture plantation." To build processing facility by 2025 to process eucalyptus into paper pulp. Targeting 7,000 jobs.
14	Cefloma	Own plantation	NA	Forest plantation. Manica province, Manica district.
15	IFM	Own plantation	NA	Forest plantation for pulp and paper. Manica province, Gondola district.
16	Chikweti Forest (Green Resource)	Own plantation	NA	Forest plantation for pulp and paper. Niassa province, Lago and Lichinga districts.
17	Companhia florestal Massanguolo	Own plantation	NA	Forest plantation. Niassa province, Ngauma district.
18	New Forest	Own plantation	NA	Forest plantation. Niassa province, Lichinga district.
19	Green Resource	Own plantation	NA	Forest plantation. Niassa province, Sanga district.
20	Floresta do Niassa	Own plantation	NA	Forest plantation. Niassa province, Lichinga district.
21	Green Resource	Own plantation	NA	Forest plantation. Nampula province; Mecuruburi, Ribaua, Nampula districts.
22	Nitacua (Green Resource)	Own plantation	NA	Forest plantation. Zambezia province, Ile district.
23	Tectona Forest (Green Resource)	Own plantation	NA	Forest plantation. Zambezia province; Gurue, Milange, Namarroi districts.
24	ATFC II	Own plantation	NA	Forest plantation. Zambezia province; Namarroi district.
25	Floresta do Planalto (Green Resource)	Own plantation	NA	Forest plantation. Niassa province, Chimoni district.
26	Komatiland - IFLOMA	Own plantation	NA	Forest plantation. Sofala province, Muanza district.

NA = not available

Source: Compiled by Global Development Solutions, LLC

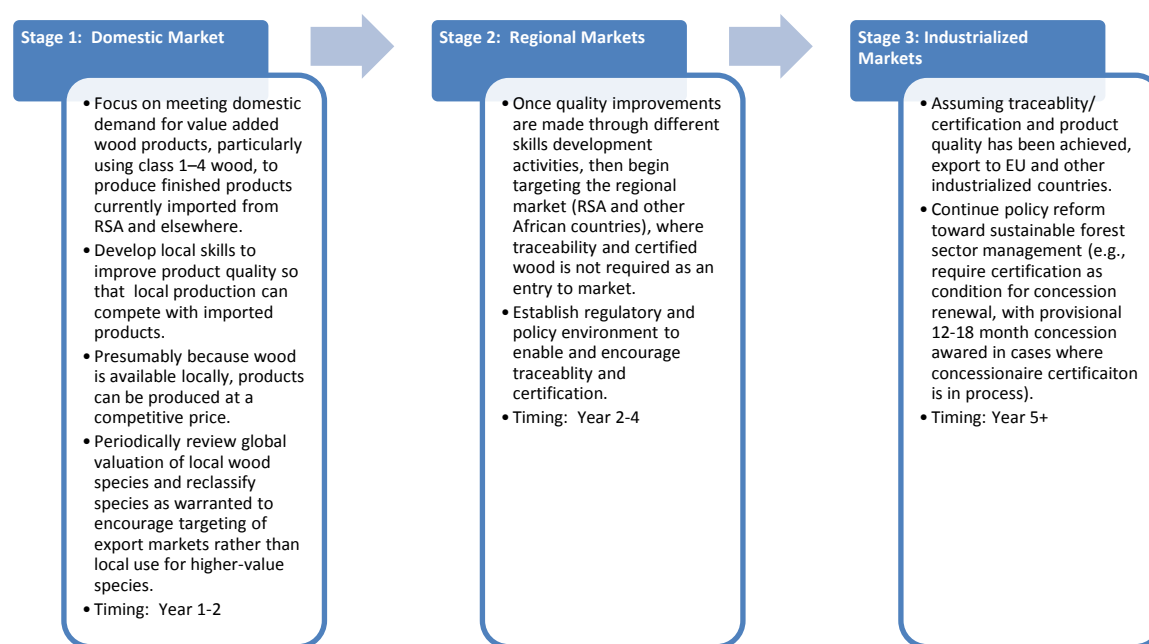
5.6 Strategy to Expand Local Value Added Production

The Government ban of log exports provides an opportunity to add value locally. Theoretically, precious and class 1 wood should be used to produce only high-end, high-value products, while class 2-4 wood may be used to produce medium- and lower-end household products and other products currently imported into Mozambique. However, consideration should be given to global market prices, which may warrant species reclassification to better guide local decisions regarding species use.

Currently the local market does not exhibit product and price segmentation. Whether a door/window frame is made from a precious wood or from a lower grade wood, the local market in Mozambique is not price sensitive based on wood type and does not pay more for a higher-value species. The lack of product-price segmentation in the market reflects the lack of understanding regarding what price the foreign market is willing to pay for finished/semi-finished products using precious woods. Lower grade wood can be used to make the same products that are currently being produced using precious woods, thus better utilizing locally available wood and keeping the precious wood for high-end markets.

A three-stage strategy to expand local value added production could be as follows:

Figure 14: Strategy for Value Addition of Wood Products for Local and Export Markets



Source: Global Development Solutions, LLC

6. Construction

The construction sector in Mozambique is summarized in the table below, with elaboration in subsequent sections.

Table 41: Sector Profile: Construction

Key Factors	Profile
Relevance	<ul style="list-style-type: none"> • Contributes 3% to GDP • Grew on average 10% per year during 2005-2010, versus GDP growth of 7%
Production	<ul style="list-style-type: none"> • 3 subsectors for civil construction: civil construction, heavy construction, building materials • Building materials produced locally include bricks, cement, concrete, asphalt, paving blocks, building blocks, pre-cast wall panels, palisade fencing, concrete floor tiles, roofing plates of fiber cement, paving stones, drainage channels, bridge parapets, metal structures • Cement annual production of 4 million tons (2013) • Production in north consists largely of concrete firms
Supply chain	<ul style="list-style-type: none"> • About 2,500 firms operating nationally; dominated by SMEs • Among licensed civil construction firms: 40% in Maputo city and province, 13% in Nampula, 12% in Sofala, and less than 8% each in the remaining provinces • 60% of the inputs used by producers of building materials and by heavy construction companies are imported • Although the local cement industry capacity exceeds domestic consumption, operational problems and production interruptions limit local cement supply, resulting in 20% imports
Employment	<ul style="list-style-type: none"> • Sector employs more than 20,942 people (2008)⁹⁹ • Most employees are in the south: 49% in Maputo province, 25% in Maputo city; Manica, Sofala and Tete employ between 5% and 10% • Limited official data regarding sector participation; companies do not have to provide total employees to association or government statistics offices • Expected 10-year demand for new construction workers in the north is 30,000
Consumption	<ul style="list-style-type: none"> • Rapid growth in heavy construction works (railways, highways, airports, ports, dams, production plants, etc.) • Major projects in natural resources (gas, coal, heavy sands, offshore gas) require construction and building materials and housing of workers (for whom 10,000 homes are needed)
Key challenges	<ul style="list-style-type: none"> • Market and supply chain access differs for larger, mostly foreign owned firms versus domestic SMEs, with local firms in a secondary position (big/foreign clients are served ahead of small/local firms) • Small size, inexperience and skills gap make local firms not competitive for major procurement bids • Input and labor shortages cause market failure, with demand satisfied by imports despite excess local capacity • High price of key inputs (e.g., cement, machinery equipment) • Lack of skills and capacity development in the north (import workers from the south) • Low levels of donor support and development financing

Source: Compiled by Global Development Solutions, LLC

6.1 Sector Background in Mozambique

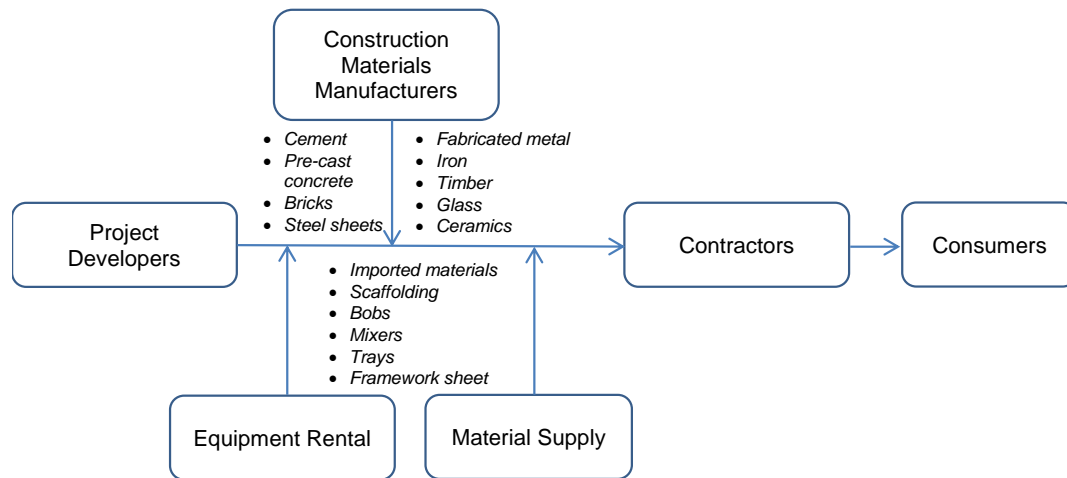
⁹⁹ Ficheiro das Unidades Estatísticas (FUE) (Statistics Data Base)

Market structure. The Mozambique civil construction sector has three forms:¹⁰⁰

- (1) Civil construction
- (2) Heavy construction
- (3) Building materials

Construction industry participants include project developers, construction materials manufactures, equipment rental, material supply, contractors and consumers, who may be industrial or individual and public or private sector. In addition to manufactures, traders in construction materials sell to construction firms and to wholesalers and retailers. In some cases they also offer logistics, business brokering, storage and distribution services.

Figure 15: Construction Industry Participants



Adapted from The Challenges and The Way Forward for the Construction Industry in Mozambique, International Growth Centre Mozambique, Aug 2012 (rev Sept 2012).

Contractors are registered and licensed for public works contracts of different categories on the basis of a minimum capital requirement. For example, a firm with a Class 1 license is permitted to work on contracts of value not exceeding MZN350,000 (USD6,863), while a Class 7 firm can work on contracts valued up to MZN50 million (USD980,392) (see table below). There are an estimated 2,490 firms operating nationally, principally operating in Maputo city and province (together, 40%), Nampula (13%) and Sofala (12%). The dearth of firms operating in the north also contributes to lack of competitiveness and ability to supply services to the forestry and gas concessions operating there. Small- and medium-size firms (up to 250 employees) dominate the sector. Micro companies also operate (up to 10 employees) in the north. Micro and SMEs account for about 95% of companies operating in the sector.

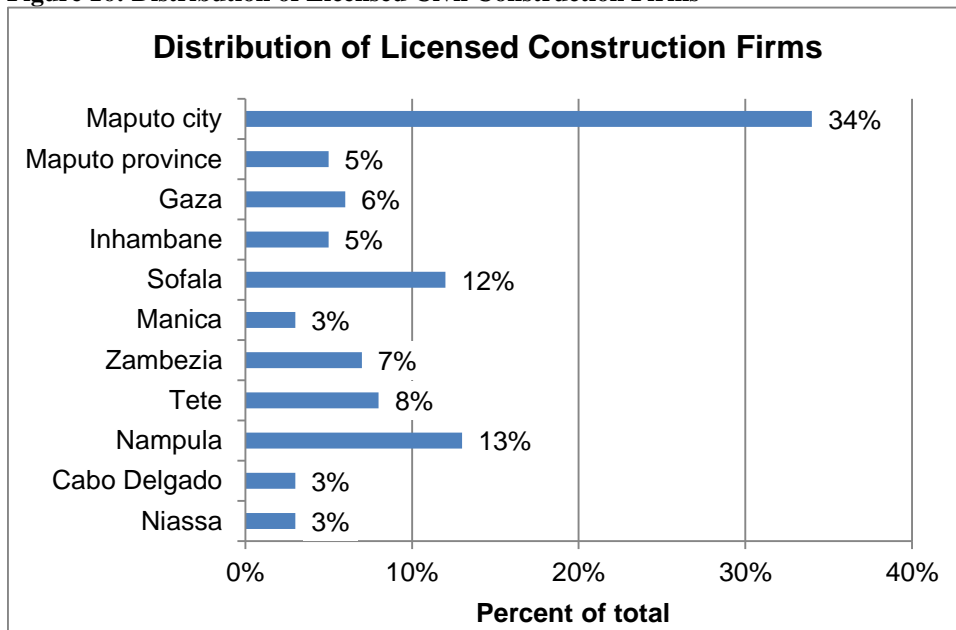
¹⁰⁰ The Challenges and The Way Forward for the Construction Industry in Mozambique, International Growth Centre Mozambique, Aug 2012 (rev Sept 2012).

Table 42: Structure of Mozambique Construction Sector

Class	Number of firms	Percent of total firms	Maximum contract value		Minimum capital requirements (MZN000)	Permanent technical team
			(MZN000)	(USD)		
1	156	6.3%	350	6,863	20	1 civil builder
2	248	10.0%	850	16,667	50	1 civil builder with 5 years' experience
3	1,283	51.5%	2,500	49,020	150	1 mid-level engineer and 1 civil builder
4	314	12.6%	5,000	98,039	500	1 engineer or architect and 1 mid-level engineer
5	226	9.1%	15,000	294,118	1,500	2 engineers or 1 engineer and 1 architect or 1 engineer to 2 mid-level engineers
6	49	2.0%	50,000	980,392	5,000	3 engineers and 1 mid-level engineer or 2 engineers, 1 architect and 1 mid-level engineer
7	214	8.6%	over 50,000	980,392	10,000	5 engineers and 2 mid-level engineers or 3 engineers, 1 architect and 2 mid-level engineers and with more than 5 years' experience
Total	2,490	100.0%				

Source: T. Zengeni, B. Baloyi, S. Roberts, *Evaluating Local and Regional Supplier Inputs to Mega-infrastructure Projects: Lessons from the Moatize Railway, Mozambique*, Centre for Competition Regulation and Economic Development (CCRED) (RSA), 14 July 2015.

Figure 16: Distribution of Licensed Civil Construction Firms



Total may not sum due to rounding by the source.

Source: *Perfil do Sector da Construção Civil, PIREP, Sept 2010*

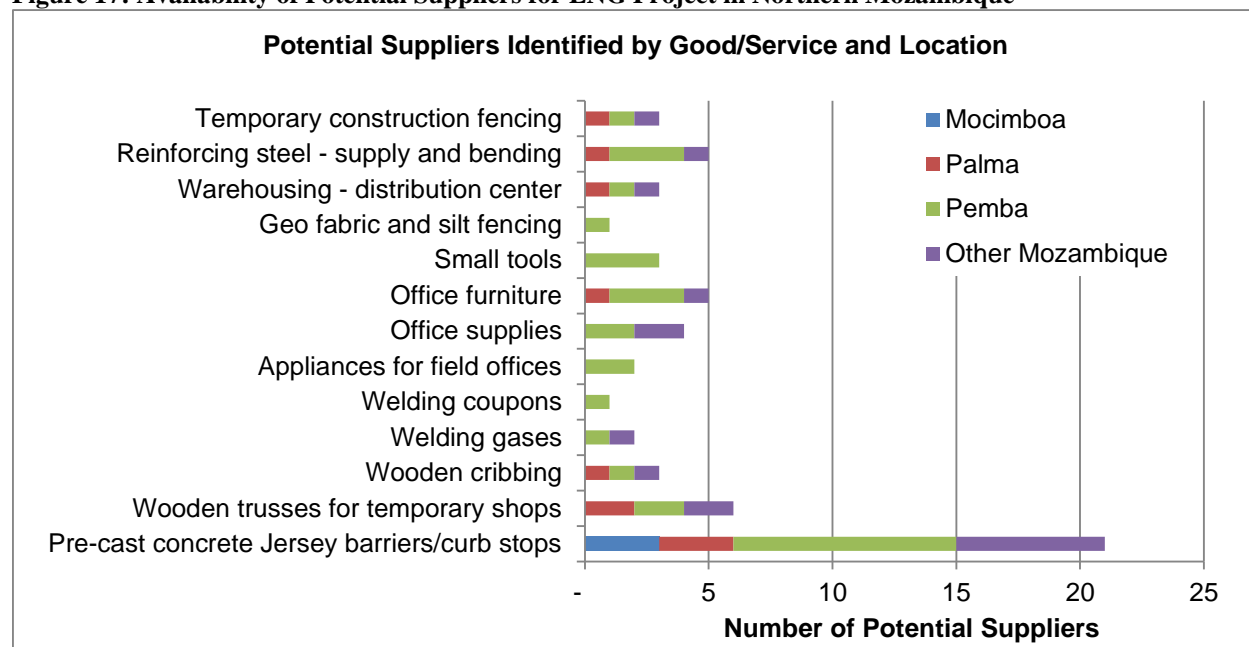
Official statistics detailing the construction sector are lacking. Detail on the business activities of the licensed construction firms was not available; companies are not required to provide such information to an association or to a government statistics office. For example, there are 271 construction companies registered in Cabo Delgado Province, but their estimated output capacity or total number of employees is unknown.

Growth of construction and demand for construction goods and works in the north is intertwined with activity of the natural resources sector (for example, liquefied natural gas or LNG). A survey in 2014 of products sought to be purchased locally in conjunction with a gas field establishment revealed that in the northern Cabo Delgado/Palma/Pemba area, existing local suppliers of most goods was limited, other than that of pre-cast concrete products (e.g., jersey barriers and curb stops).¹⁰¹ The existence of current local production capacity of pre-cast concrete in the north provides opportunity for assessment regarding the competitiveness and scalability in order to develop employment potential. For example, to fully meet multinational buyer requirements and produce individually engineered pre-cast products made to client specifications such as load carrying capacity or use of green production (e.g., use of recycled materials), the pre-cast concrete manufacturers may need to upgrade their factory production environments, which require highly experienced personnel who apply stringent quality control.¹⁰²

¹⁰¹ Concrete is a building material and a composite of aggregated including sand, gravel, cement, water and other materials. Cement is a key ingredient in concrete and typically makes up 10% to 12% of the concrete volume. Pre-cast concrete is preferred over field-fabricated concrete for construction, since pre-cast has lower water-cement ratios, which enhances durability and reduces construction waste and debris on site. Source: Sustainability and Precast Concrete, http://www.pre-cast.org/docs/sustainability_and_precast_concrete.pdf

¹⁰² Pre-cast products are individually engineered and can be made to specifications regarding load carrying capacity, optimized cross sections and span length, e.g., strength of 5,000 psi to 7,000 psi or more, with densities that minimize permeability. The factory production environment requires highly experienced personnel who apply stringent quality control. Pre-cast concrete input materials can incorporate industrial byproducts such as fly ash slag and silica fume to improve performance, reduce landfill waste, reduce production cost and reduce the proportion of cement used in concrete. Reinforcement typically is from recycled steel. Insulation and connections also can be incorporated to the pre-cast concrete. Source: Sustainability and Precast Concrete, http://www.pre-cast.org/docs/sustainability_and_precast_concrete.pdf

Figure 17: Availability of Potential Suppliers for LNG Project in Northern Mozambique



Potential suppliers may be manufactures or vendors. All suppliers noted have at least one location in Cabo Delgado province, in or in close proximity to the target area. Suppliers with offices or operations in multiple locations (e.g., sales office in Pemba and manufacturing facility in Mocimboa) are noted in all applicable locations.

Source: *Mozambique Gas Development Project: Enterprise Survey*, Global Development Solutions, LLC, 10 March 2014

Construction sector worker demand in the north is expected to increase by 30,000 people in the next ten years, according to the CEO of Capital Outsourcing Group (COG) in South Africa, who also notes that the current vocational and practical professional training available is not sufficiently connected to the private sector reality and is too supply oriented. The private sector requires more practical training with upgraded classroom equipment and regular, short company placements in the construction industry. New jobs are expected to require skills at different levels and specializations, which to a large extent requires an additional and upgraded training capacity if the goal is to maintain a high level of local employment, and to reduce “imported” labor to the north from central and southern Mozambique.

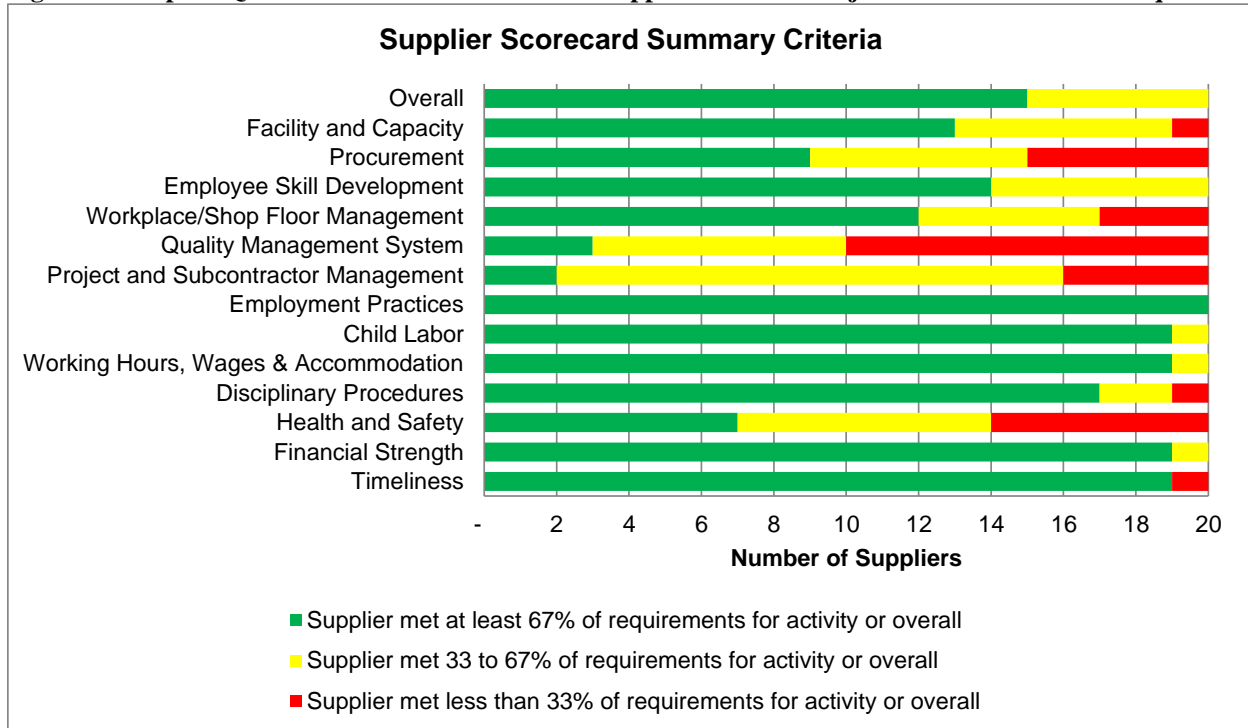
Local firms struggle to compete in major procurement bids offered by the multinational extractives and other potential clients. Compared to the larger foreign firms, local firms lack linkages to foreign investors and markets and have poor credibility, short track records, are too small to qualify for bid, have input and labor shortages, pay high prices for key inputs (e.g., cement, machinery equipment), lack certification, apply limited use of modern technology, and are in a low position in the supply chain queue (big/foreign clients are served ahead of small/local firms).¹⁰³ Such challenges point to opportunities for joint/regional partnerships to

¹⁰³ T. Zengeni, B. Baloyi, S. Roberts, Evaluating Local and Regional Supplier Inputs to Mega-infrastructure Projects: Lessons from the Moatize Railway, Mozambique, Centre for Competition Regulation and Economic Development (CCRED) (RSA), 14 July 2015, and John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

build local capabilities, regional development financing, establishment of local manufacture of strategic construction material manufacturing and retailing capabilities, skills development of the civil construction sector and reducing delays at borders for imported inputs.¹⁰⁴

To this point, an assessment of supplier readiness in the north, regarding ability of local manufacturers and vendors of construction and other goods sought for procurement by LNG operations, found that local suppliers overall lacked compliance with many of the standards sought by multinational buyers in order to integrate vendors to their supply chain. As illustrated below, a majority of suppliers performed satisfactorily with respect to employment practices and working hours/wages, but found it challenging to meet standards in areas such as procurement, quality management system, project and subcontractor management and health and safety. Thus significant but targeted capacity development is needed in the north in order to bring suppliers to an acceptable level of readiness.

Figure 18: Gaps in Qualifications of Local Potential Suppliers to LNG Project in Northern Mozambique



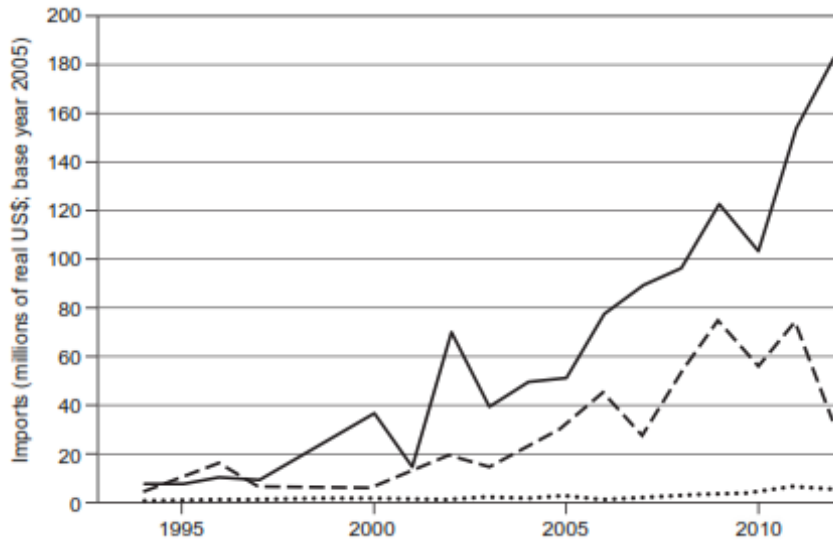
Source: *Mozambique Gas Development Project: Enterprise Survey*, Global Development Solutions, LLC, 10 March 2014

Beyond the official sector, there are many informal participants of micro and small size that employ many young people, for example in concrete block production. Bureaucratic procedures for formalizing businesses remain a challenge for these companies.

¹⁰⁴ T. Zengeni, B. Baloyi, S. Roberts, Evaluating Local and Regional Supplier Inputs to Mega-infrastructure Projects: Lessons from the Moatize Railway, Mozambique, Centre for Competition Regulation and Economic Development (CCRED) (RSA), 14 July 2015.

Supply chain. Contractors often rely on imports to fill gaps in local supply of building materials. For example, despite excess capacity in the industry, only 80% of local cement needs can be fulfilled locally, with imports comprising the other 20%.¹⁰⁵

Figure 19: Mozambique Imports of Construction Materials



Solid line = iron and steel; dashed line = cement; dotted line = glass.

Source: UN Comtrade as cited in John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

About 60% of the inputs used by producers of building materials and by heavy construction companies are imported.¹⁰⁶ A survey of 30 building materials companies and contractors conducted in 2012 revealed that about 35% of companies sourcing from abroad do so because they believe that the materials are not available locally, while 45% do so because prices of imported materials are below those in the domestic market. Among the reasons cited by contractors for using foreign suppliers were: domestic suppliers fail to deliver on time (10%) and provide low-quality materials (10%).¹⁰⁷ For better control of quality, supply chain and timing, most large construction companies produce their own supplies.¹⁰⁸

Mozambican companies typically have to go through three steps to import raw materials, as noted below, which adds time and cost.

- (1) hire an import broker to start the import process;
- (2) pay import duties; and
- (3) clear the imported material at customs and deliver to the factory.¹⁰⁹

¹⁰⁵ John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

¹⁰⁶ ANNEM (2000) as cited in John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

¹⁰⁷ Nhabinde, V., C. P. Marrengula and A. Ubisse. 2012. The challenges and the way forward for the construction industry in Mozambique. Working Paper, International Growth Centre, as cited in John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

¹⁰⁸ John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

¹⁰⁹ ANEMM (2000) as cited in John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014.

Delays in reimbursement of VAT (which is charged at a uniform rate of 17% in all the relevant sectors, including in construction and building materials) lead to problems with cash flow, which can be particularly problematic for SMEs in the sector.¹¹⁰

Growth rates vary widely for construction products. GDP grew on average 7% from 2005 to 2010, and the construction sector grew 10%, products like cement and flat-rolled steel kept pace with the overall construction industry, while product like glass, clay and construction stone were lagging. Growth rates for cement varied widely during 2005-2010, as low as -29% and as high as 91%, indicating opportunity but also some turbulence in the sector, perhaps from pent-up demand and large projects. Factoring in that 2010 cement growth was coming off a low point, the average growth for construction over the two years of 2009 to 2010 was 31%, which is promising and reflects expansion of the industry.

Table 43: Annual Growth Rates for Sub-Sectors of the Construction Industry, 2005-2010

Sector or Sub-sector	2005	2006	2007	2008	2009	2010	Average	Low	High
Other basic non-ferrous metals products	-24%	222%	-18%	16%	131%	-19%	51%	-24%	222%
Porcelain, earthenware and stoneware	6%	34%	2%	8%	49%	2%	17%	2%	49%
Cement and clinker	6%	2%	2%	-5%	-29%	91%	11%	-29%	91%
Flat-rolled products of iron and steel	5%	2%	2%	2%	5%	46%	10%	2%	46%
Construction	13%	10%	12%	13%	6%	4%	10%	4%	13%
Fibre cement lime and plaster	6%	2%	2%	-5%	56%	-13%	8%	-13%	56%
Mozambique GDP	8%	9%	7%	7%	6%	7%	7%	6%	9%
Materials clay building	4%	NA	11%	2%	-6%	16%	5%	-6%	16%
Glass and glass articles	2%	2%	2%	2%	2%	2%	2%	2%	2%
Stone for construction and other non-metallic products	2%	1%	2%	0%	70%	-72%	1%	-72%	70%

Ranked by average annual growth rate for 2005-2010.

NA = not available

Source: INE, as cited in *The Challenges and The Way Forward for the Construction Industry in Mozambique*, International Growth Centre Mozambique, Aug 2012 (rev Sept 2012).

Cement industry. Cement is the main basic product of the construction industry in Mozambique. Cement is sourced from domestic producers and importers, but the share of imports is declining as local production capacity expands. Five new cement plants scheduled to come on line in 2014 were expected to reduce the level of imports still further.¹¹¹ However, ability to meet local demand is not only a capacity issue. Total cement industry capacity is already in excess of domestic consumption, but operational problems and production interruptions limit supply.¹¹²

Mozambique has abundant deposits of limestone, but the logistical challenges of mining much of the deposits have limited the supply of clinker available to domestic cement makers. Over 3 million tons of clinker were imported during 2005-2012.^{113,114} Where available, each cement factory sources limestone from its own local area. Cement is bagged at the plant and transported

¹¹⁰ ANEMM (2000) as cited in John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014.

¹¹¹ John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

¹¹² ANEMM (2000) as cited in John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014.

¹¹³ Mozambique: the rough diamond of south-eastern Africa. *CemWeek*, June/July 2013. as cited in John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014.

¹¹⁴ Cement is produced in 3 stages: from raw material to clinker to cement. *Cement Manufacturing Process*, The European Cement Association (CEMBUREAU), <http://www.cembureau.eu/about-cement/cement-manufacturing-process>.

by truck or, to a lesser extent, by rail. Transport costs are high and the logistics of transport are difficult. An interruption to production at a single factory can lead to major shortages and price rises in a local area.

A next level of value added from cement is concrete, a solid material made of cement, water, aggregates and often with admixtures. When fresh, it has workability and takes the form of the mold into which it is put. When set and hardened, it is as strong as natural stone and resists time, water, frost, mechanical constraints and fire. Typically, concrete is the essential material used in all types of construction and applications, e.g., residential (housing), non-residential (offices) and civil engineering (roads, bridges, etc.). Recently the International Labor Organization (ILO) began promoting 'Green Construction' which focuses on substituting some of the cement used to make concrete blocks with local dirt (clay), and forming them into inter-locking blocks which requires limited amount of mortar compared to the use of conventional concrete blocks, particularly for housing construction. While the use of local dirt may contribute to reducing greenhouse gas emissions (GHG) resulting from the production of cement, it could also have the effect of reducing demand for workers in the cement industry. Moreover, 'Green Construction' also includes the use of locally available raw material, such as local wood for window and door frames, and for use as roofing material, both of which are already practiced in Mozambique.

The growth of the manufacturing industry of cement-based building materials, such as the concrete blocks, slabs, curbs, etc., is stimulating growth of the freight transport sector. It is common to see, throughout the country, trucks (for rent) for the transportation of construction materials. They are private trucks that are operated primarily by young people.

There also are many informal contractors involved in building houses. Most private houses built on the outskirts of cities and in the expanding areas of cities and towns are made by informal contractors. Many of the houses are of high quality.

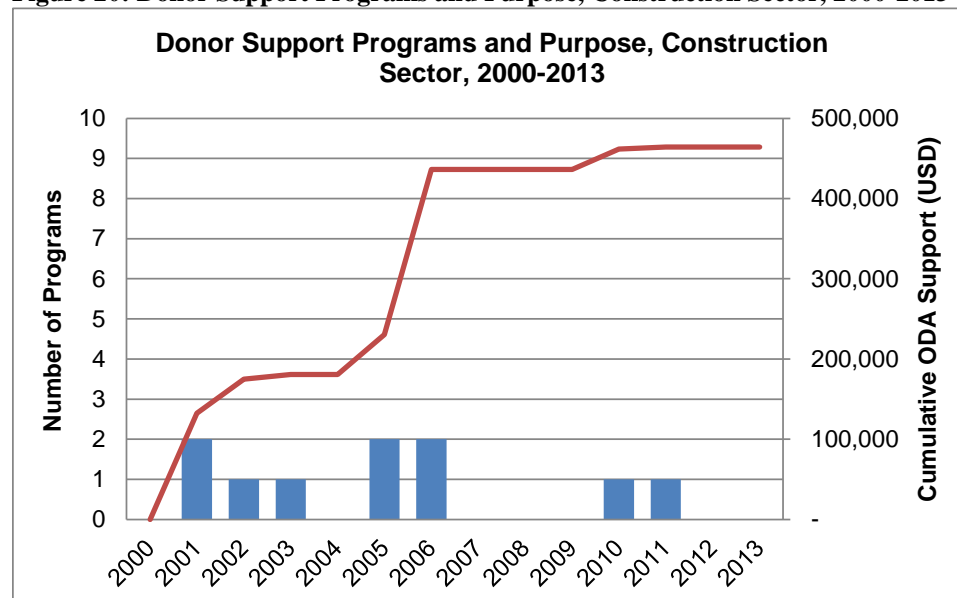
An example of the job creation potential in the construction value chain from the more recent boom in the north can be observed in Nacala (Nampula Province). Due to the presence of large investments (construction of the port, mining and gas projects), the demand for spaces for the construction of houses, warehouses and factories has grown materially in the last four years. It is estimated that there are between 10 to 15 wholesale dealers of cement, with each dealer employing 30 to 40 people. Cement is transported in rented trucks, of which there are about 15 trucks in the Nampula circuit and which employ about 30 people. The shipyards (over 50) produce concrete blocks of various sizes, and now also produce buckler for road construction. Each site employs between 5 to 8 people. There is a high demand for such products. There are between 4 to 6 large sites of production of cement-based building materials, each employing an average of 10 to 15 people.

6.2 Donor Support Programs

Compared to other sectors, there is limited donor support for construction, both in terms of number of programs and funding. From 2000 to 2013, USD464,332 was granted as Official Development Assistance to the construction sector, across 10 programs (see figure and table

below). All support was categorized for construction policy and administration management, as opposed to training and capacity development.¹¹⁵

Figure 20: Donor Support Programs and Purpose, Construction Sector, 2000-2013



Source: Open Aid Data

Table 44: Donor Support Programs for Construction Sector

	Project	Purpose	Donor	Organisation	Year	Amount (USD)	Type
1	Not specified	Construction policy and admin. mgmt	Italy	DGCS	2006	163,173	ODA Grants
2	Not specified	Construction policy and admin. mgmt	Netherlands	MFA	2001	112,843	ODA Grants
3	EXHIBITION: MODERN PORTUGUESE ARCHITECTURE IN MAPUTO / MODERN MOZAMBIKAN ARCHITECTURE IN MAPUTO.	Construction policy and admin. mgmt	Portugal	IPAD	2005	48,471	ODA Grants
4	Not specified	Construction policy and admin. mgmt	Ireland	DFA	2006	42,513	ODA Grants
5	PROGRAMA DE APOIO AO SECTOR DE	Construction policy and admin. mgmt	Netherlands	MFA	2002	42,409	ODA Grants
6	PCI. Support for the creation of the UNESCO chair of basic habitability in the Eduardo Mondlane University of Mozambique: Faculty of Architecture and	Construction policy and admin. mgmt	Spain	MFA	2010	25,563	ODA Grants
7	HAUS ALGARVE - PROJEKTZENTRUM BUZI	Construction policy and admin. mgmt	Austria	BMeiA	2001	19,525	ODA Grants
8	MAP APOIO CONSTRUCAO PACE	Construction policy and admin. mgmt	Netherlands	MFA	2003	6,010	ODA Grants
9	Grants. University education at a post grade, doctoral and postdoctoral grade, with the objective of promoting the qualification of human capital.	Construction policy and admin. mgmt	Spain	AECID	2011	2,503	ODA Grants
10	PONTE SUL FIUME ZAMBESI - FORMULAZIONE INIZIATIVA - FONDO ESPERTI	Construction policy and admin. mgmt	Italy	DGCS	2005	1,323	ODA Grants

Source: Open Aid Data

¹¹⁵ Open Aid Data, <http://www.openaiddata.org/purpose/259/323/top/>

The Government has established various policies and programs, such as the *Política e Estratégia de Habitação* and the *Estratégia e Plano de Acção para Aplicação e Disseminação dos Materiais e Sistemas Construtivos Alternativos*, as well as a regulatory framework to boost the construction industry.¹¹⁶

6.3 Potential Anchor Firms

Major firms operating in the civil construction sector are noted in the table below. The 28 firms operate across goods, works and services. Among goods firms, the identified firms largely produce basic construction materials and inputs including: bricks, cement, concrete, asphalt, paving blocks, hollow blocks, building blocks, pre-cast wall panels, palisade fencing, concrete floor tiles, roofing plates of fiber cement, paving stones, drainage channels, bridge parapets and metal structures; overall, cement and concrete production dominates the anchor list. The list also includes traders of building materials, which sell to construction firms, wholesalers and retailers, and also may offer logistics, business brokering, storage and distribution services. Such firms have established market linkages and potential to scale up for more value added production and increased direct and indirect sector employment.

¹¹⁶ John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

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Table 45: Potential Anchor Firms for Construction Products

	Firm	Location	Product	Other notes
1	Agro-Alpha SARL		Fabricates steel structures for construction	Largest metalworking company. Employs 300 in design, manufacture, repair and installation.
2	Berry Juice Construction	Tete	Blocks, bricks and paving stones; provides general services to construction companies	Est. 2004. Relocated from Inhambane to Tete where 2 large MNCs are coal mining.
3	BLITZ LM Lda	Boane (Maputo)	Concrete products including paving stone, construction blocks, tiles, drainage channels and bridge parapets	Est. 1997. 90% of output is certified by Mozambique Engineering Laboratory.
4	Cheater Industrial Roofing	Nampula	Profiled aluminum, fiber cement, steel roofing and cladding, ventilation, associated metal sheet work. Builds structural steel units.	Approved supplier and installer for Global Roofing Solutions, Vento, Clotan Steel, Safintra, Macsteel.
5	CETA - Construcao e Servicos SA	most active in north (Tete, Cabo Delgado)	Major works (public contracts, buildings, roads, concrete and steel structures, water supply, sanitation, drainage).	Employs 2,600 (306 full time). Turnover USD60 million (2012).
6	Cimento Nacional Lda	Matola	Cement	Est. 2010. Production capacity of 250,000 tons/year. 1 factory. 130 workers. Installed capacity of 250,000 tons/year. Imports limestone, gypsum and clinker from various countries and fly ash from South Africa.
7	Cimentos de Mocambique	Matola (2), Dondo (2), Nacala (1)	Cement, concrete	Privatized in 1994. Expanded capacity by 400,000 tons (2012). Plans to expand to 1 million tons/year total. Accounts for 3/4 of national sales. 5 plants. Employs 2,000. Sales of USD167 million (2013). Wet and semi-wet processes. Also produces 420,000 m3 of concrete annually, supplied from 8 depots nationally via subsidiary Cimbetao.
8	Cimentos de Nacala	Nacala (Nampula)	Cement	Est. 2005. 1 factory. Pwn limestone quarries. Cement mill with installed capacity of 350,000 tons/year.
9	Cometal	NA		Privatized in 1993.
	Construtores Chemane Lda		Civil construction, public works, industrial construction, road construction, manufacture of building materials and water boreholes. Sale of construction materials for woodwork, metalwork and pavements.	Est. 1987. Family business. 250 permanent employees and 500 part-time. Turnover USD4 million (2011). Grade 7 registered license from Ministry of Public Works and Housing. Most raw material is sourced domestically. Imports cast iron from South Africa and finishing materials from South Africa and Portugal.
10	Distribuidora de Materiais de Construcao	NA	Distribution of construction materials	Was state-owned, now private (1987).
11	Electrotec SA (Intelec Holdings Group)		Major works in construction of energy systems (electricity grid).	Est. 1997. Core staff of 100. Turnover USD11 million (2011). Current projects in Niassa, Cabo Delgado, Zambezia, Sofala, Inhambane, Maputo. ISO 9001:2008.
12	FF Wire	Matola (Maputo)	Steel fencing	Design, manufacture and construction of steel fencing. Products include field fencing, galvanized binding and train wire, high-tensile wire, barbed wire, flat wrap and concertina razor wire, gates, and galvanized and black palisade fencing.
13	Forjadora	NA	Fabricates steel structures for construction	Privatized in 1993. Major metals firm. 80 employees.

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	Firm	Location	Product	Other notes
14	Hariche Group Ltd.	NA	Manufacture and trade in a range of building materials, including production of steel and furniture.	200 employees. Annual sales revenue USD26 million. Est. 2000 as Hariche Steel International. Started with manufactured steel roofing sheets, now diversified including steel (roofing sheets, pipes, lip channels, section bars), cover plates for domestic light switches, modular kitchen and wood furniture. Imports and distributes aluminum structures, glass, door fittings, consumer products, beauty products, cleaning products. Steel is sources from South Africa, China, Turkey and India. Planning to make plastic pipes and more steel gutters and related fixtures.
15	Intersteel Rollings Mozambique Lda	Beira, Chimoio, Tete	Corrugated and galvanized iron roofing products.	Stockist of certified steel products for the construction and engineering industries.
16	Lusalite de Mocambique	Sofala	Roofing plates from fiber cement (known as "lusalite")	
17	Matola Block Yard	Matola	Concrete blocks	
18	Metalia Mocambique, Lda	NA	Design and assembly of metal structures including industrial warehouse roofing, metallic molds for preformed concrete, excavator buckets	Subsidiary of Spanish Metalia Group.
19	Mota Engil SARL - Delegation of Mozambique (EMOCIL)	NA	Major work (bridges, schools, Olympic village)	Portuguese multinational. Annual turnover USD130 million (2012). Employ 1,200. Sources 65% of raw materials locally. Various certifications.
20	Mozal Aluminum		Aluminum production	Only aluminum producer. Est. 1999. Employs 1,190 directly and up to 3,500 indirectly through domestic suppliers. Suppliers are recruited via large-scale formal program designed to engage local SMEs.
21	Mozrih Metais, Lda	Maputo	Zinc roofing plate, tiles, paving stones, concrete blocks	Est. 1997.
22	Mukoque Construction	NA	Trader of construction materials	Sells to construction firms and to wholesalers and retailers; also may offer logistics, business brokering, storage and distribution services.
23	Ollava	Sofala	Paving blocks, building blocks, precast wall panels, retaining wall blocks, curb stones, palisade fencing, concrete floor tiles	
24	SOMOFER	NA	Trader of construction materials	Sells to construction firms and to wholesalers and retailers; also may offer logistics, business brokering, storage and distribution services.
25	Sulbrita Lda	primarily south; also Maputo and north	Concrete and asphalt; precast building materials, including concrete blocks and paving blocks	Subsidiary of CMC (Italy). 480 full time employees. Annual sales USD24 million. Main market in south. Also operates in Niassa, Cabo Delgado and Nampula (supplies concrete for Nacala corridor), Sofala and Maputo (supplies CMC). ISO 9001 certification. Working on South African Bureau of Standards. Sources stone and cement locally. Imports bitumen and additives for asphalt.
26	Sunera Cement Ltd	NA	Cement	1 factory. Blends Portland cement with additives to reduce acid corrosion. Installed capacity of 127,500 tons/year.

	Firm	Location	Product	Other notes
27	Tijoleira de Mocambique	Namaacha (Maputo)	Bricks from rhyolite plaque	Exports 400 tons of bricks/month to South Africa. Operates below capacity because suppliers of rhyolite plaques are small artisanal companies and can't supply all needed.
28	Turnkey Solutions Mozambique	Beluluane Industrial Park	Manufactures metal roofing sheet, metallic coating and prefabricated walls, for local assembly in prefabricated buildings and for export.	

NA = not available

Source: Compiled by Global Development Solutions, LLC

Historically, the sector attracted relatively little foreign direct investment (FDI) (USD8 million for the construction sector or 1.0% of all FDI in 2010).¹¹⁷ However, segments of the industry are rapidly expanding, so the list of anchor firms is also in flux. For example, nine new cement factories are planned or under construction to be operational in 2015, including production by three Chinese companies planning to operate in Magrude, Salamanga (south of Maputo) and Boane Industrial Park (Maputo). A fourth Chinese firm reportedly is planning a new cement factory at Cheringoma district, Sofala. The South African cement firm Pretoria Portland Cement also plans investment (location unknown).^{118,119}

6.4 Market Demand

Overall, value added growth of the construction industry in Mozambique averaged 11% per year from 1992 to 2012. Despite the construction boom, the building materials industry (e.g., cement, iron and glass) grew only 2% per year on average from 2005-2012.¹²⁰ The lag partly is due to a scarcity of high quality locally available inputs which preclude the local firms from fully participating in sector growth.

Nationally, rural-urban migration and an emerging urban middle class are spurring local demand for housing, construction services and materials. According to the state-owned Fund for Housing Promotion (FFH), there is a housing deficit of 2 million units.¹²¹ The housing deficit is partly attributed to the high growth rate in the country's population, which swelled from 20 million in 2007 to 25 million in 2014, as well as to rising disposable incomes which increase capacity to buy homes. Population growth has been particularly high in the 19-29 year age

¹¹⁷ Mining and quarrying commanded the greatest share of FDI in 2010 (92.6%). John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014.

¹¹⁸ John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014

¹¹⁹ Portland cement is a typical ingredient of concrete, and the most widely used type of cement. It was invented in the early 19th century and named after the fine building stones it resembled that were quarried in Portland, England. The innovation of Portland cement marked a milestone in the construction history, as it created a far stronger bond than the plain crushed limestone of the day. Today it remains the best performing and most economical binder used in concrete. Source: Sustainability and Precast Concrete, http://www.precast.org/docs/sustainability_and_precast_concrete.pdf

¹²⁰ John Sutton, An Enterprise Map of Mozambique, International Growth Centre, 2014

¹²¹ Mozambique housing deficit hits 2 million units, Club of Mozambique, 27 May 2014, <http://www.clubofmozambique.com/solutions1/sectionnews.php?secao=mozambique&id=32619&tipo=one>

group, a segment with many first-time home buyers.¹²² Over 4,500 new housing units are expected to enter the market in central Maputo over the next 5 years, versus projected demand of 23,000 units in the same area.¹²³

New home development has focused primarily on the mid- and high-end real estate markets versus affordable housing. One project, Casa Jovem at Costa do Sol in Maputo, focuses on the affordable market, and built 100 units with prices ranging from USD47,000 to USD130,000.¹²⁴ Reportedly, Real Estate Consulting (REC) plans a large affordable housing project Cabo Delgado. Still, affordable housing remains a relatively untapped market. The preference for investment in high-end real estate has been attributed to several factors as noted below:

- 1) With such high construction costs, high-end real estate presents less risk due to potential for large price mark-ups
- 2) Unexpected costs can be more easily offloaded onto buyers in the high-end market, while affordable housing requires much stricter pricing strategies and therefore better planning
- 3) There is a lack of government grants to support affordable housing projects
- 4) Much of the land which is cheap enough to develop low-end housing is isolated from major transport networks and other infrastructure, and as such prohibits large-scale affordable housing projects.

Besides Maputo, emerging economic centers such as Tete, Nampula and Pemba are quickly developing housing shortages. Real Estate Consulting (REC) estimates that demand in Nacala will grow to 4,475 units over the next 5 years, and to 6,500 units in Pemba. Such demand increases present opportunities to eager investors, some of whom are now partnering with the Fund for Housing Promotion (FFH).¹²⁵ FFH carries out social housing projects, for example, Chiuba Village, a 1,200-house estate project in Pemba (Cabo Delgado province) costing USD60 million (estimated 2014, thus USD50,000/home) and built through a public-private partnership with a company from United Arab Emirates.¹²⁶ FFH plans to construct 100,000 homes nationally, to address the issue of affordable housing, particularly for the estimated 13.5 million people (2.5 million households) or 60% of the population that live in unfit housing, frequently informal (concrete block-by-block or traditional straw hut construction by individual owners) and lacking access to basic services and facilities such as piped water, roads, sanitation and electricity.¹²⁷ “Affordable” housing is a relative term and USD50,000/unit still is too dear for much of the population. Reportedly, Mozambique has the highest housing costs in Southern Africa, due to the high costs of construction materials (nationally, more than 30% higher than in

¹²² Mozambique housing deficit hits 2 million units, Club of Mozambique, 27 May 2014, <http://www.clubofmozambique.com/solutions1/sectionnews.php?secao=mozambique&id=32619&tipo=one>

¹²³ Area defined as: Beixa, Museu, Polana, Sommerschild I, Sommerschild II and Marginal neighborhoods. Mozambique housing deficit hits 2 million units, Club of Mozambique, 27 May 2014,

<http://www.clubofmozambique.com/solutions1/sectionnews.php?secao=mozambique&id=32619&tipo=one>

¹²⁴ Mozambique housing deficit hits 2 million units, Club of Mozambique, 27 May 2014, <http://www.clubofmozambique.com/solutions1/sectionnews.php?secao=mozambique&id=32619&tipo=one>

¹²⁵ Fundo de Formanto da Habitação

¹²⁶ Mozambican housing fund plans to set up public-private partnerships, Macauhub.com, 27 June 2014

¹²⁷ Over half of Mozambican population lives in unfit housing, Macauhub.com, 23 Feb 2011

South Africa, and higher in the north¹²⁸) and lack of access to financing, especially for low- and medium-income households.

Besides local housing, construction sector demand also comes from heavy construction works (railways, highways, airports, ports, dams, production plants, etc.) and major projects in natural resources (gas, coal, heavy sands); recent major offshore gas projects are expected to continue the trend with the need for both infrastructure and housing. Massive investments in the LNG sector in Cabo Delgado of up to \$54 billion will take place between 2016 and 2024. From 2016 onwards, with an expected peak in 2018, Anadarko and ENI plan to finance construction of up to 10,000 houses for workers and staff involved in the LNG plant erection. Non-official sources calculate that about 14,000 to 15,000 workers will be needed for the construction of housing in Palma, including 25% skilled, 57% semi-skilled and 18% unskilled labor. The estimates have not yet been officially confirmed by Government, the vocational training service sector or Anadarko/ENI. The expected new housing demand of 10,000 new homes likely cannot be provided by the north, however, due to several reasons:

- The training output of regional training facilities (trainees per year) is far below the requirement of the Palma LNG project (housing and infrastructure);
- The current level of technical formation is basic, and upgraded training material is not available;
- Vocational education and practical training is not well-coordinated in the region;
- Neither Government (Direção Provincial de Trabalho, Emprego e Segurança Social) nor the vocation training service sector is fully aware of how many additional workers are needed as from 2015, and what technical standards need to be introduced to the curricula; and
- Particularly for large scale projects financed by multinationals, quality standards are high, and the global firms struggle to identify local suppliers in the north for their desired goods works and services.

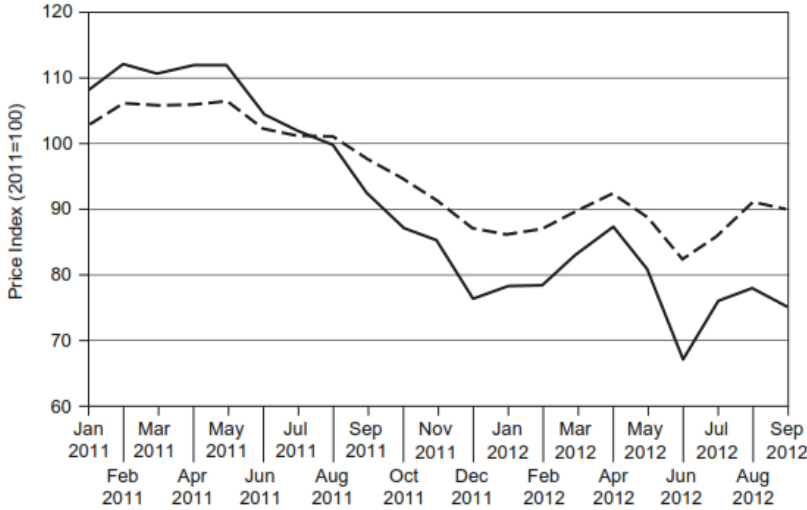
The expected construction demand will spur demand for cement-based building materials. Cement and concrete have a multitude of applications, including concrete light poles, drainage pipes, roofing tiles, flooring, pre-cast concrete walls and articulated concrete blocks, which in combinations with geotextiles, are used as revetment systems for erosion prevention.

6.4.1 Average Market Price and Production Trends

The prices of basic metal products and intermediate goods, which include a wider range of construction materials, declined from 2011 to 2012. Reasons were not clear and require further investigation, though the time period of data is short so may not be indicative of long term trends.

¹²⁸ Mozambique - CEM - Construction sector - draft, World Bank, 2009,
<http://siteresources.worldbank.org/INTDEBTDEPT/Resources/468980-1218567884549/5289593-1259608803444/MozambiqueCEMConstruction20090821.pdf>

Figure 21: Prices of Building Materials, January 2011 to September 2012

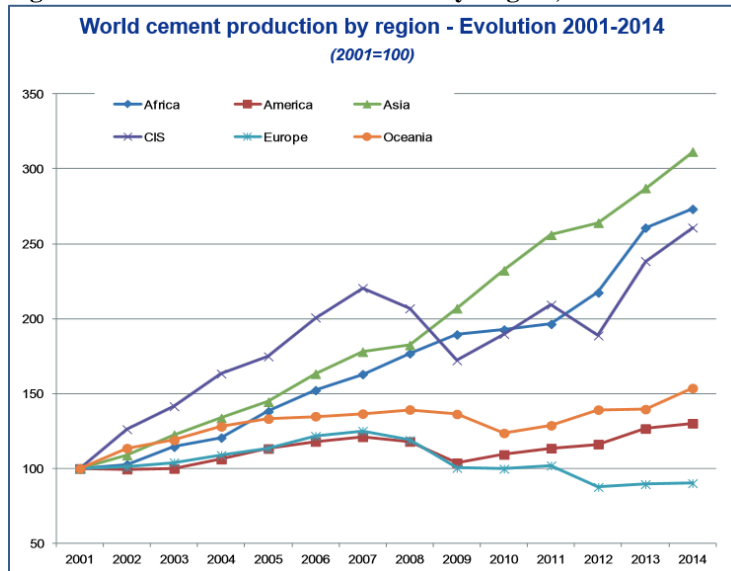


Solid line = metal products; dashed line = intermediate goods.

Source: UN Comtrade as cited in John Sutton, *An Enterprise Map of Mozambique*, International Growth Centre, 2014

Over the long term, growth in African cement production has outpaced that of other world regions, second only to Asia; both regions are experiencing high population growth and high natural resource exploitation.

Figure 22: World Cement Production by Region, 2001-2014



Source: The European Cement Association (CEMBUREAU)

6.5 Employment Potential for the Construction Sector

The challenge facing the selection of a product from the construction sector is that engineered products require substantial level of technical skills and must meet industry or international

technical specification before it can be certified for use in an operation. On the other hand, the construction sector requires a wide range of non-technical products, but generally these products only require low or no skills to produce, thus limiting prospects for labor mobility and opportunities for further value added production.

The general employment multiplier for the construction industry is approximately 2.1 - 2.3,¹²⁹ but employment multipliers vary substantially according to products and activities. The following section explores two product options that show potential for growth in the northern region.

Housing Construction: Given the shortage of housing throughout the country and in particular in the north where there is a fast pace of growth in the oil and gas sector, one focus of the analysis should be on housing construction, but sub-divided into a number of different segments to get a good understanding of employment implications for the different segments including the following:

- Private home construction (mostly unpermitted small private homes);
- Multi-unit residential housing (condominium and apartment complex); and
- Public housing or public buildings.

Construction Material: Given the anticipated growth and demand for housing construction, the second area recommended for the analysis is construction material. A substantial amount of concrete blocks is locally produce, particularly for use in the construction of private homes, and similarly, wood frames for trusses and other structural components using local wood and imported pine are also being produced locally. In addition, a number of local firms are producing fabricated steel structures, corrugated and galvanized steel and tin roofing and cladding, and sheet metal ventilation for commercial building and multi-unit residential construction. It is not clear whether other products such as plumbing supplies including different types of pipes and fittings, and electrical product such as wiring, switches, exchange boxes, etc. are currently being fabricated in Mozambique.

In this regard, the focus of the recommended analysis should be on identifying opportunities and potential for expanding local production of value added construction materials that can take advantage of the growing demand for residential construction. The analysis can help expand the understanding of employment creation opportunities for unskilled, semi-skilled and skilled workers, and the type of support required to develop a robust construction material sector in Mozambique.

6.6 Summary of Shortlisted Construction Products

Shortlisted categories for consideration include residential housing and construction material is detailed below. Although both residential housing and construction material are in high demand, multi-unit residential construction and the construction of public buildings and housing will

¹²⁹ Developing a trade and industrial policy agenda for service sectors in South Africa, J.Hodges. Department of Trade and Industry, 2002

require a workforce with advanced engineering degrees and certificates, which only a select few larger companies are licensed to undertake. Moreover, the need for an advanced technical degree may limit the number of firms, at least in the short-term, that can take advantage of the growth opportunity in the residential construction sector. At the same time, however, expanding the construction material sector has the potential to absorb a substantial number of unskilled and semi-skilled workers, particularly in the central and northern region of Mozambique where construction demand is expected to continue to grow.

Table 46: Summary Pros and Cons of Construction Product Selection

Product	Pros	Cons
Residential housing	<ul style="list-style-type: none"> • High demand for housing, particularly in northern region driven by the O&G sector • Country-wide housing shortage • Growing informal construction industry, particularly for low cost residential construction • Growing cement industry to supply locally produced cement to residential housing sector 	<ul style="list-style-type: none"> • Lack of technical skills, particularly certified engineers required for construction of multi-unit and public housing construction • Limited ability to read and follow diagrams and sketches • Limited drafting skills • Weak network of training institutions to improve technical skills • Limited availability of locally manufactured construction material (excluding concrete blocks and wood frames) • Lack of standards and measurements for residential construction
Construction material	<ul style="list-style-type: none"> • High demand for housing, particularly in northern region driven by the O&G sector • Country-wide housing shortage • Growing informal construction industry, particularly for low cost residential construction • Growing cement industry to supply locally produced cement to residential housing sector • Availability of local wood to fabricate windows and doors 	<ul style="list-style-type: none"> • Lack of technical skills, particularly engineering skills required to design and fabricate engineered products • Limited ability to read and follow diagrams and sketches • Lack of standard measurements for residential construction

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