

The opportunity of high value processing linked to farm forestry in Kenya

November 2021



GATSBY
AFRICA

Objectives

- Introduction to farm forestry
- Resource base identification
- Opportunity for higher value market and closing the timber supply and demand gap
- Kenya Commercial Forestry Programme's focus

Farm forests have been identified as a resource base of significant scale and can play a key role in reducing Kenya's wood supply deficit

Farm forestry (<1 acre) represents the largest resource base in Kenya with an estimated 300,000+ ha of land under such production systems.

Eucalyptus is the most prominent species indicating a lower preference for softwood species due to their long rotations (15+ years) which lead to unattractive cashflows.

Remote sensing pilot study of farm forestry resources in Western and Central Kenya through Swift Geospatial KE indicate a growing wood supply deficit.

Can the farm forestry resource base reduce this supply deficit? There is a strong indication that this is possible. Remote sensing work in Bungoma and Nyandarua shows a vast area of farm forests resource base that can reduce this wood supply deficit.

Remote sensing work in Bungoma shows a vast area of farm forests resource base



Security of supply is critical but the quality of resource as well as cost effective aggregation systems adapted to farm forestry are crucial

Farm forestry resource base

- Limited knowledge of the farm forestry resource base in terms of volumes and quality – only high-level assessments have been made but not sufficient to prove a business case and support investment
- Limited grower access to high value markets due to competing softwoods and poor offtake models
- Limited quality of standing timber limiting processing options



Harvest and Haulage

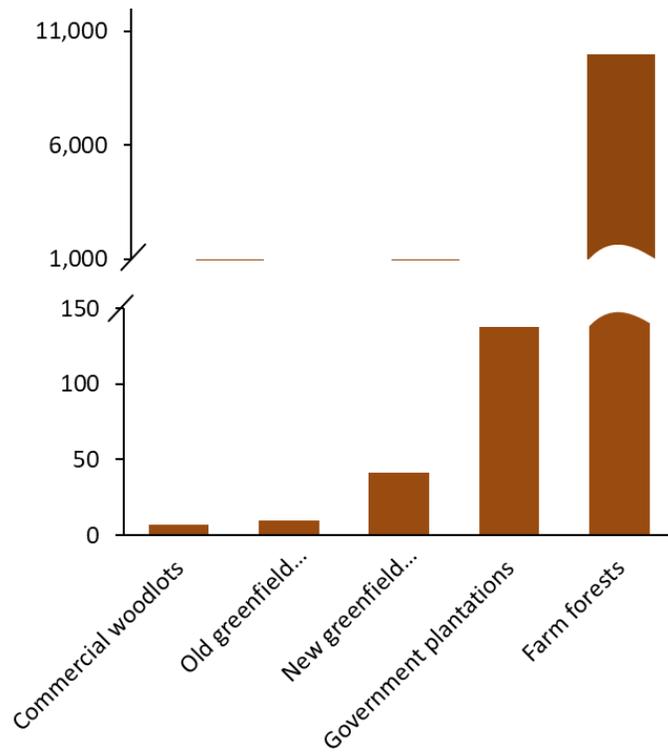
- Harvest and haulage models mainly run by processors are adapted to securing material from centralized public plantations
- High fragmentation, low volumes per grower thus increasing sourcing costs



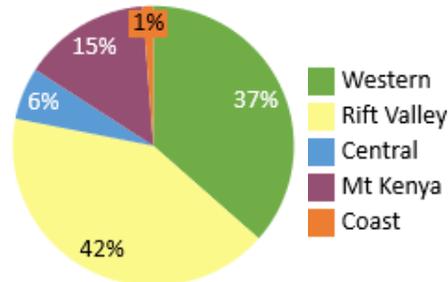
However, most wood from these systems is processed and consumed domestically or sold into informal, local, low value markets. The processing technologies used realize low value recovery for growers and processors.

Supply bases for commercial forestry in Kenya

Ha, thousands



Farm Forestry – 312,600 ha (total area under trees)



Processing technology and available skills are adapted to softwood processing while access to finance is a key constraint facing SMEs

Processing and Value addition challenges

- Limited adoption of efficient technologies for processing Eucalyptus maximising 100% utilisation and value recovery
- Lack of awareness about technology options
- Limited skills and support services in their operations
- Lack of security of supply justifying capex investment
- Splitting and machining issues
- Competition from low value end use e.g., wood fuel + panel manufacture (MDF – e.g., Timsales)



New technologies in sawmilling will create more efficient processing and higher quality end products, opportunities to access higher value markets

- With the significant scale of farm forestry, coupled with the increasing national lumber supply-deficit, there is potential to crowd-in several new processing investments, increase demand for raw material and create greater incentives for additional, quality tree planting.
- Kenya has a vast farm forestry resource base but wood from these systems goes into informal, low-quality processing, producing low value products. Optimized wood processing enables maximum value recovery from raw material.
- If farm forestry production systems can be competitive in higher value markets, this would represent a compelling opportunity to realise additional, quality tree planting thereby contributing to 10% tree cover targets.
- The above, would both create opportunities for processing smaller diameter trees with knock on benefits for firms and private growers (thinning and shorter rotations)
- However, currently there are constraints across the value chain stopping this from happening. The two most critical constraints are:
 - i) Security of supply of raw material
 - ii) Low demand for Eucalyptus lumber in formal markets – leading to Eucalyptus lumber trading at a discount relative to softwood species.
- Eucalyptus processing requires specific technology to overcome processing challenges – verticil twin saws, finger jointing and kiln drying. KCFP is providing technical assistance to potential investors through identification, procurement, installation, and operation of the right processing technologies.
- KCFP is testing the feasibility of bringing wood from farm forestry systems into more efficient, high value sawmilling, with the objective to scale viable models.

Example structure for a competitive forestry model for Eucalyptus sawmilling from farm forests

The rationale is that higher technology sawmilling including kiln drying and optimisation through finger jointing will enable maximum value recovery via accessing higher value markets, and in turn, enable higher value offtake of raw material between processors and growers.

Wood supply:

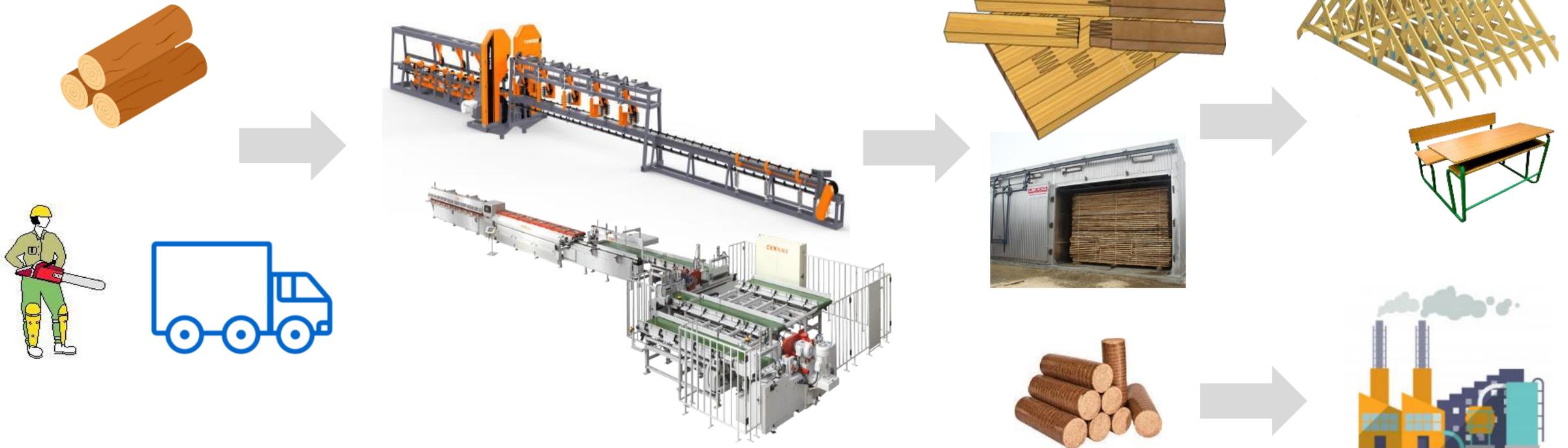
- Roundwood aggregation from farm forestry
- Transportation to the processor

Processor:

- Twin vertical saw bands used to split logs – key for Eucalyptus
- Block Saws and Horizontal band saws further cut it into planks and trimmer trims to length

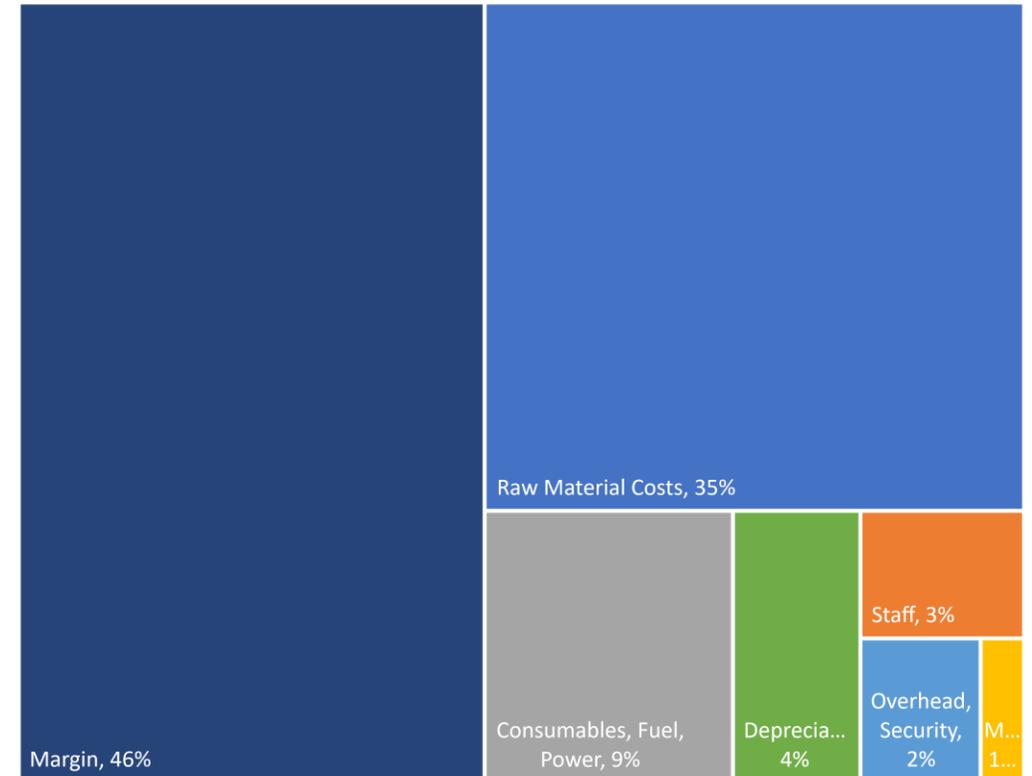
Higher value products

- Kiln drying and finger jointing
- Saw dust, chips and flitches are chipped for fuelling the boiler



A large set up could require ~404M KES CAPEX yielding >46% margins, for a 1.7 Years pay-back time, selling 508M KES/year

UNIT ECONOMICS: Avg m2 Sold	TOTAL	%
Raw Material Costs	12,263	35%
Staff	932	3%
Consumables, Fuel, Power	3,018	9%
Maintenance	280	1%
Overhead, Security	776	2%
Depreciation	1,547	4%
Margin	16,262	46%
Total	35,078	100%



Key Assumptions

- Plantation MAI at 14 m³/Ha/year, 2,898 Ha under cultivation, Log cost at mill gate 4,600 KES/m³
- Average rotation est. at 10 years, 90% of logs below 190mm top diameter
- Main Sawmill line running at 22 mt/min, fed 40,572 m³/year (161m³/day) equal to **100% of 1-shift capacity**, can be limited by Ha available
- Average cutting RR=40%, yielding 15,409m³/year of sawn boards per annum
- 5 Drying Kilns and 2 Double FJ Shaper
- Average sales price across grades = 35,078 KES/m³

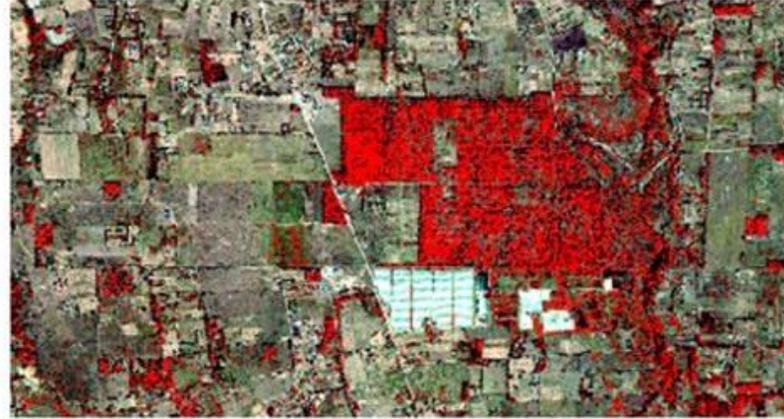
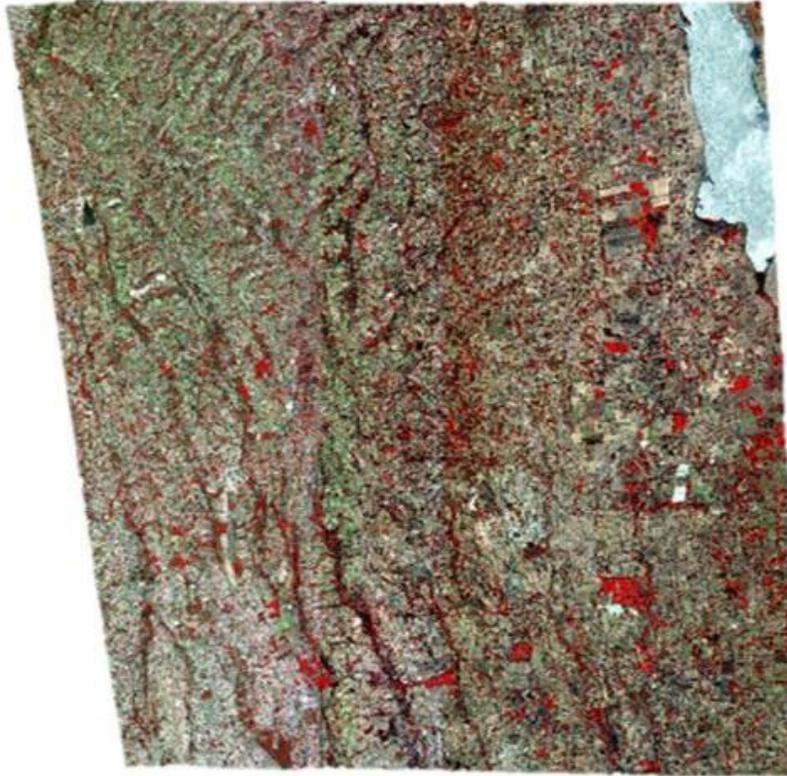
We need to develop markets to recognise and pay for quality timber and include Eucalyptus as part of that strategy

The wood supply and demand gap is projected to increase due to unstable supply. Demand for sawn timber is expected to continue increasing due to a growing population and demand for housing. This demand has traditionally been met through supply from public plantations with softwoods dominating i.e., cypress and pine.

KCFP is looking to demonstrate that wood from farm forestry systems, majority being Eucalyptus, can competitively supply higher value processing – specifically value-orientated sawmilling – to access more formal, higher value markets and substitute mahogany; in turn, driving new processing investments supplied by this resource base.

Annex

Remote sensing work in Nyandarua shows a vast area of farm forests resource base



Optimization technologies exist to maximise value from limited quality standing timber



Impact

1 million grower households, 11,000 direct jobs and 52,000 indirect jobs

1mill+ ●——● Grower households

- 1 million+ growers' households selling trees to industrial processing mills – based on a sustainable harvesting scenario, e.g. 1 million+ across average rotation length
 - 1 farm forest = 1 household
 - 1 woodlot = 1 grower household

10,978 ●——● Direct jobs

- Direct jobs:
 - Plantation companies
 - Harvest and haulage teams
 - Processing operations
 - Jobs from nurseries, contractors and other service providers not included

52,000 ●——● Indirect jobs

- Indirect jobs – initial estimate at least 52K based on ILO rural incomes multiplier

Challenges

If farm forestry production systems can be competitive in higher value markets, this would represent a compelling opportunity to realise impact at scale and a pathway to sector transformation. However, currently there are seven constraints across the value chain stopping this from happening. The two most critical constraints are:

- i) Security of supply of raw material – recognising investors will need confidence that raw material from 3rd party growers is guaranteed before committing capital;
- ii) Low demand for eucalyptus lumber in formal markets – leading to eucalyptus lumber trading at a discount relative to softwood species.

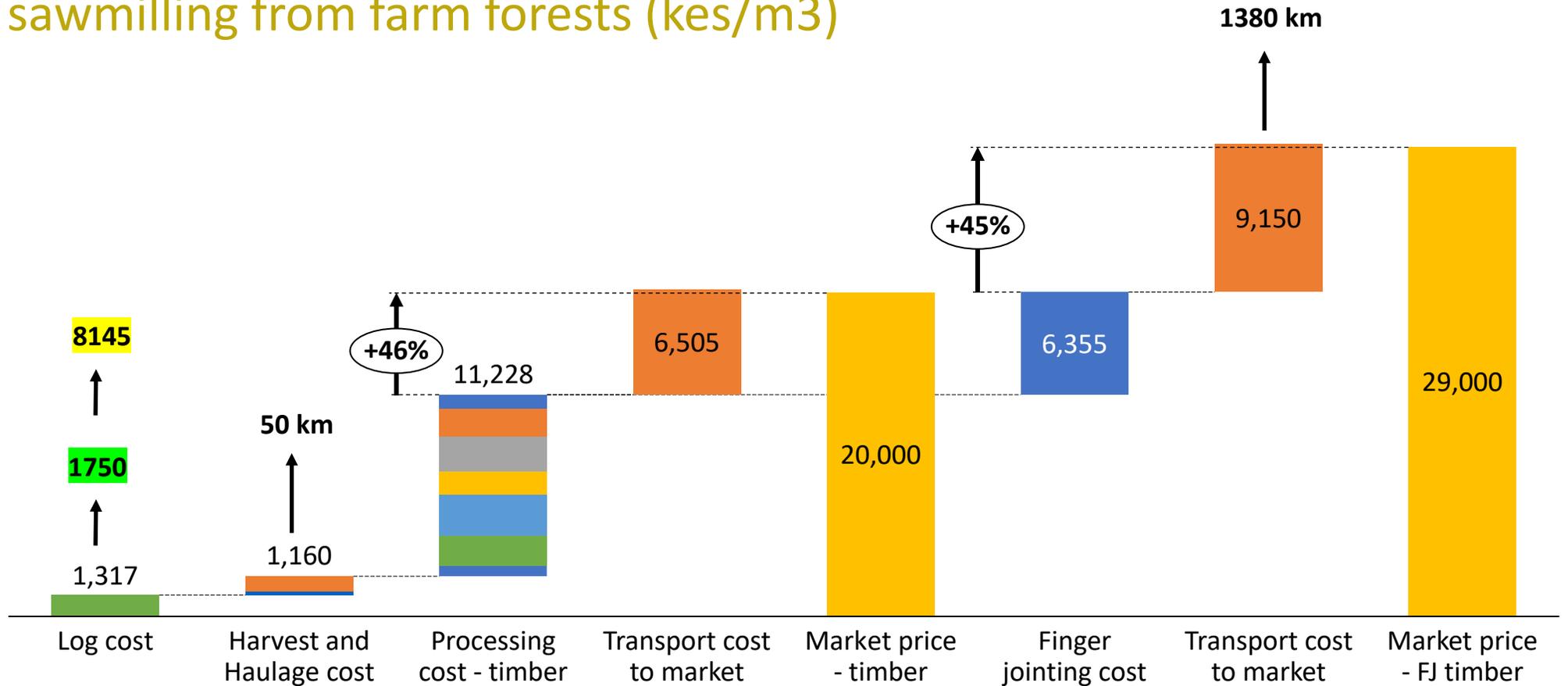
There are seven constraints, stopping farm forestry Eucalyptus growers from supplying higher value lumber markets as seen below:

1. Quality of raw material
2. Cost effective aggregation
3. Security of supply
4. Appropriate processing technologies
5. Access to finance
6. Skills and operational systems
7. Low demand for eucalyptus lumber

Example competitive sawmill model

Eucalyptus sawmilling from farm forests (kes/m³)

286 ha/ year of trees → approx. 3,000 farmers in western. Sustainable system = 2,860 ha; 30,000 farmers



Assumptions

- 20% hurdle rate factored into grower log price
- 20% hurdle rate factored into harvest/ haulage
- 15% hurdle rate factored in for processing

Case study: Montigny in Eswatini is an example of what is required in terms of processing and market orientation



- Montigny is a vertically integrated forestry company in Eswatini with over 55,000 ha of plantation – Eucalyptus and Pine spp – and diversified processing (sawmilling, kiln drying, optimisation, CCA, chipboard/ value addition) sold into local and Southern African export markets.
- Whilst a resource base beyond EA scale, Montigny’s processing lines are modular with individual lines suitable for EA. Processing operations are matched to raw-material and driven by a dynamic marketing team to ensure business is always market optimised. Clear lumber extraction has just begun.



Sawmill feeder showing Euc logs of TED of 8 – 14cm



Two modular VTS sawmill lines in parallel

Developing local and regional markets to realise higher value and in turn make grower returns more attractive

1) Opportunities for high-quality Eucalyptus sawntimber in **high-value furniture** applications

→ Can locally grown Eucalyptus **substitute unsustainable mahogany** demand, realising **higher value** and **environmental benefits**?

→ Could such a market signal drive **more investment in primary processing** and increase offtake demand for quality wood from **small scale tree growers**?

2) Structural market opportunities → roof trusses and building materials

→ Can **higher quality sawntimber** enable more competitive roof trusses vs steel, creating **more demand for sustainably grown wood** and **reducing use of high-embodied carbon** products

3) Development of an EA Cross-Laminated Timber (CLT) industry

→ Opportunity to **reduce 37% of global GHG emissions** from buildings and construction through substitution of concrete and steel with wood

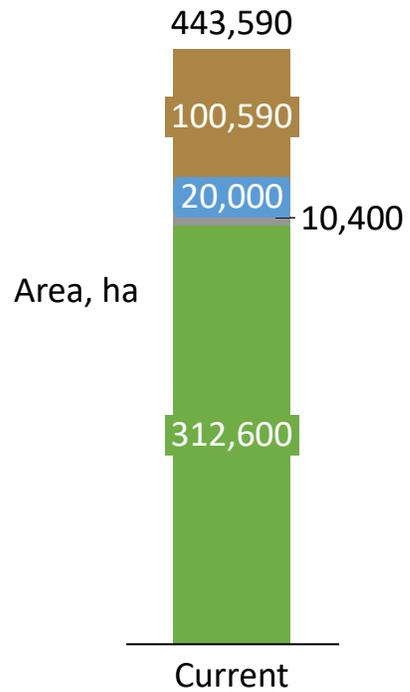
→ Create a high-value, high-volume demand pull to further incentivise more tree growing and investment in processing

→ '3S Model' – drive climate benefits via 'sinks', 'storage' and 'substitution



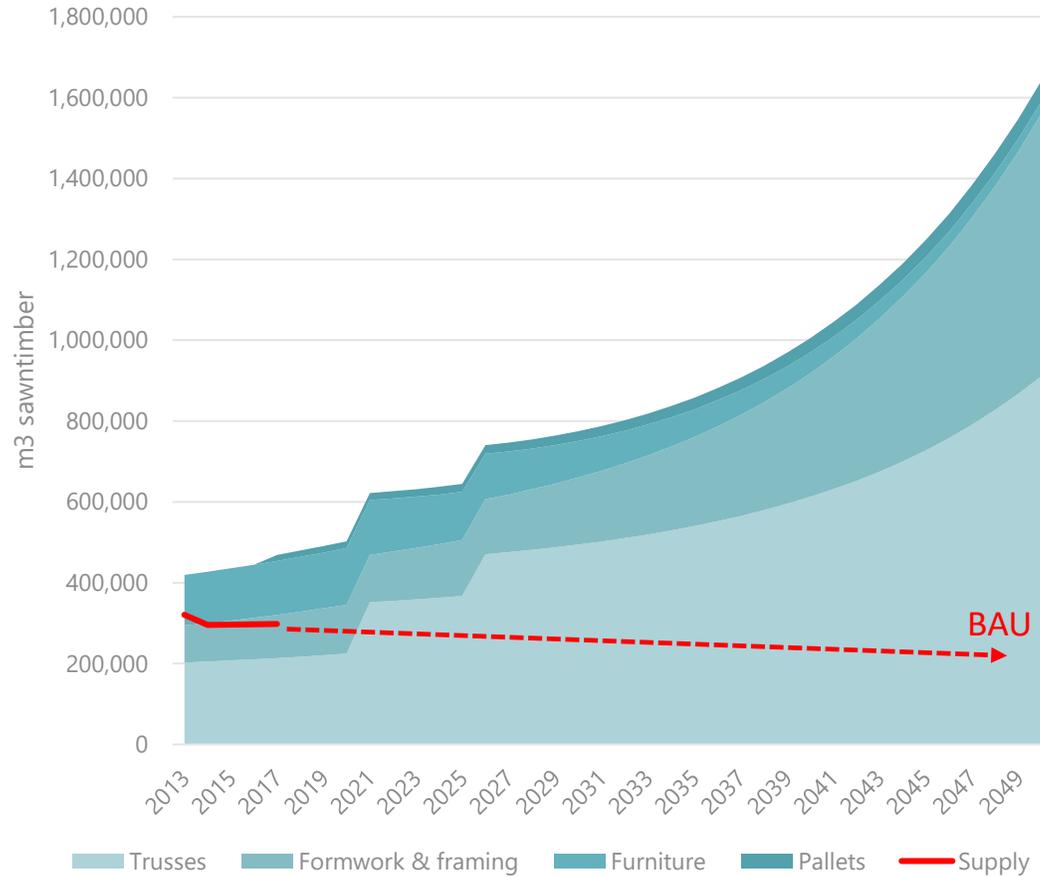
Bringing farm forestry growers into higher value markets

Kenya CF resources

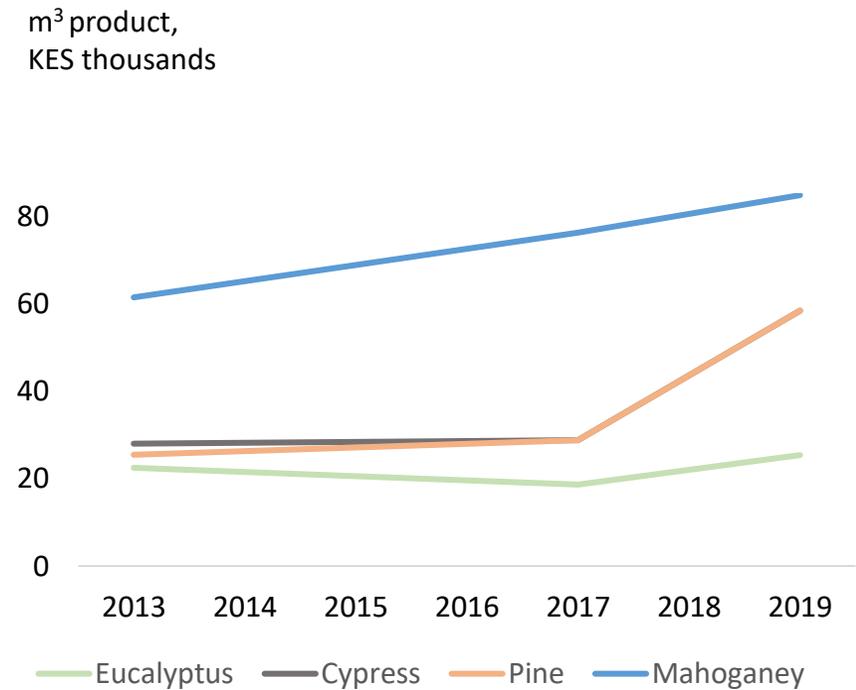


- Farm Forestry
- Woodlots
- Plantations
- County Land
- KFS Plantations

Sawn timber supply – demand projection



Sawn timber Nairobi retail prices





KOMAZA



KEFRI - PRESENTATION

NAIROBI

Nairobi | 22/10/2021

Introduction

Komaza Team:

- Esther Muthoni Mutuma - Consultant
- Charles Irungu Kimiti - Processing Director
- Matteo Contardo - Consultant



Social Economic Impact

Invested Sum: **650M Ksh**

Expected Revenues: **200M Ksh** in 2022

Expected Revenues to farmers: **95M Ksh** in 2022

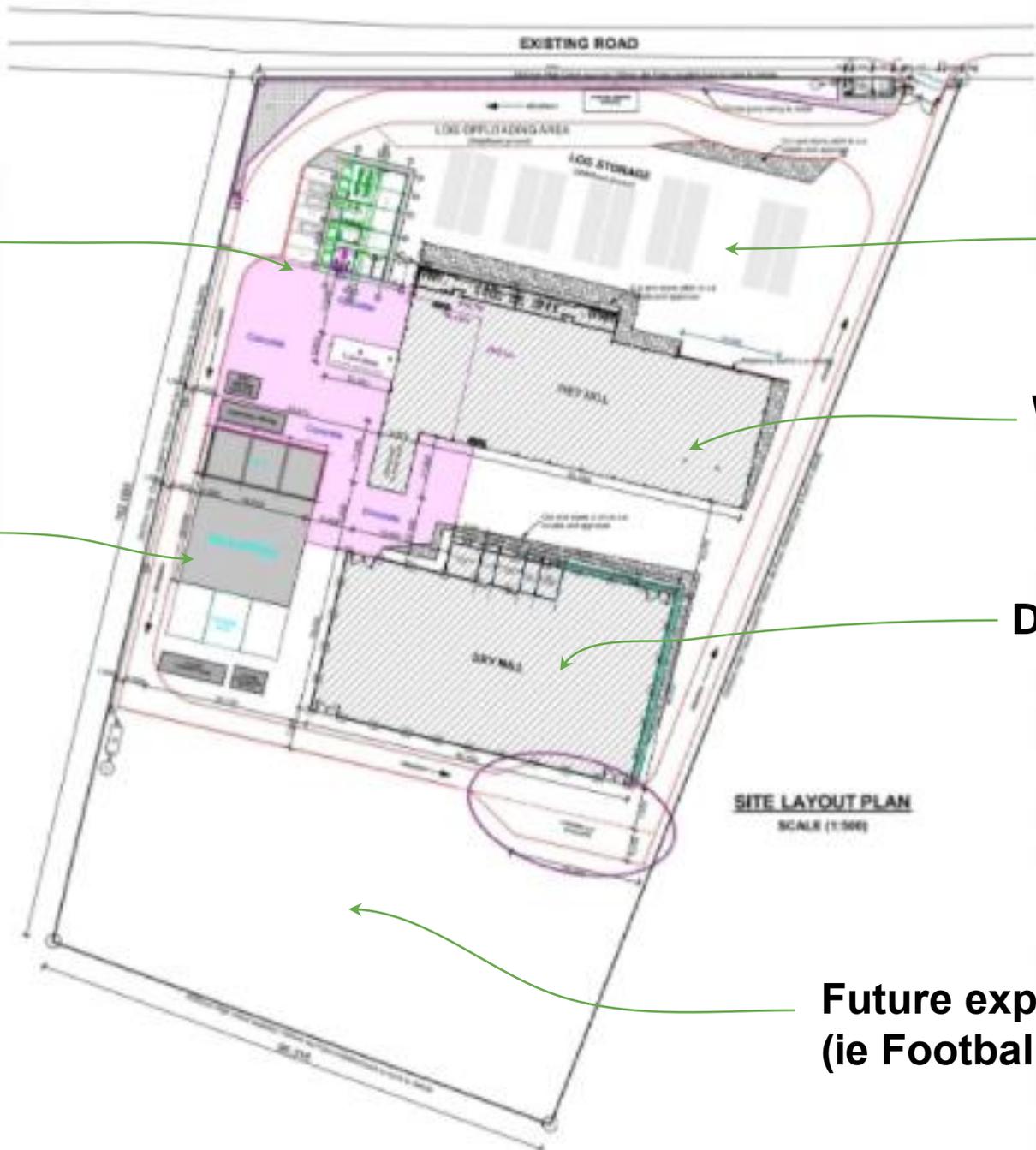
Staff employed at Ol Kalou Sawmill: **65** skilled and unskilled

Expected Planting Target: **1 Million trees** in 2022

What we are building

The Team...





Office

Log Storage

Kilns & Boiler

Wet Mill

Dry Mill

**Future expansion
(ie Football Pitch ⚽)**

The green field...



March 2021



Sept 2021

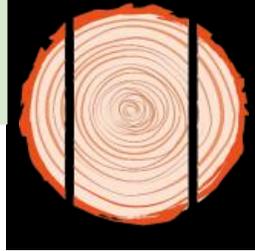


- Major construction complete ie Wet mill, Drymill and gate house.
- Office block and the Kilns foundation ongoing - 80% done
- Electrical installations and KPLC connection ongoing.

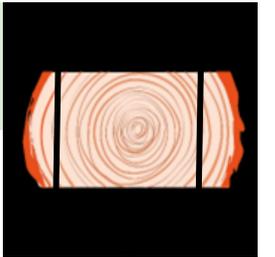
Wet Mill: from Logs to Planks



Twin Vertical Saw



Bandsaw Block

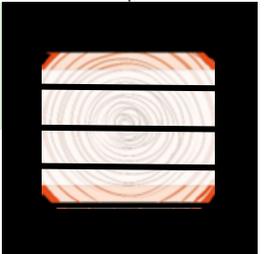


Trimmer

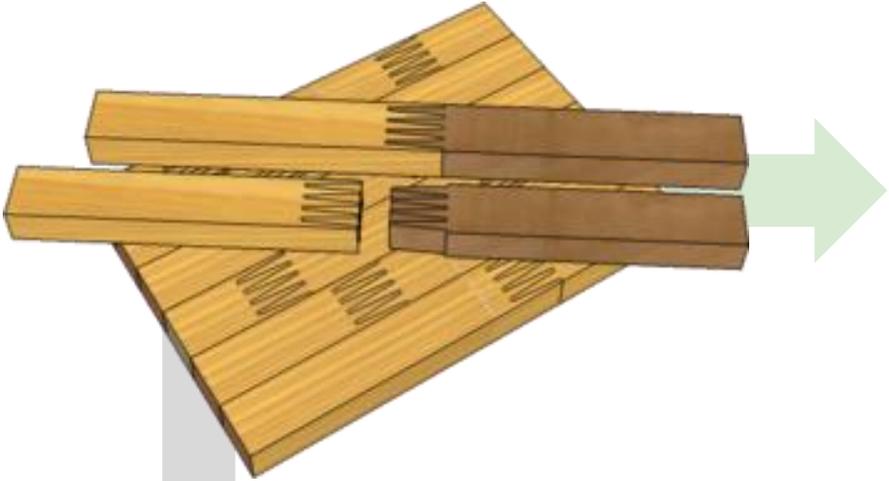


Cut to length

Horizontal Bandsaw

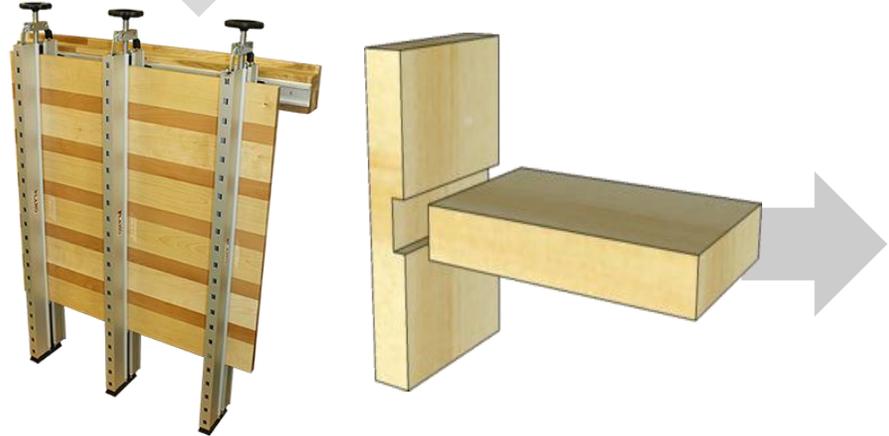
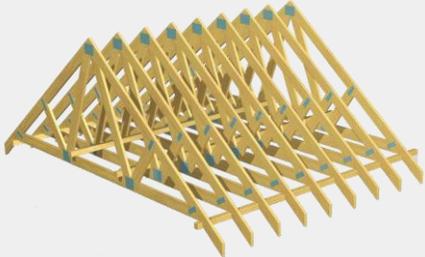


Dry Mill: Finger Jointer Post Processing



Structural Lumber

Roof/Construction Beams, Mouldings



Consumer Products

School Desks, Cabinets, Doors, Stairs, House/Office Furniture, Decking, etc.



Additional Equipment

Bell Logger

Move logs around



Kiln

Dry lumber (3x79m³ capacity)



Saw Workshop

Maintain CAPEX,
sharpen saws



Forklift

Move lumber around



Boiler

Burn wood waste → heat for kiln



Chipper

Offcuts → wood chips for boiler



Equipment Suppliers



Wet Mill equipment

~6 containers, from Lages, Brazil
ETA OI Kalou End December 2021



Timber Drying equipment

~4 containers, from Germany
ETA OI Kalou - Beginning December 2021



Finger Jointing equipment

~2 containers, from South Africa
ETA OI Kalou - 25th October.

High Level Timeline

- Construction completion - End november 2021
- Equipment delivery to site - End December 2021
- Installation and commissioning - End Feb 2022
- Start of Operations - March 2022

***We will communicate the official inauguration date in Feb 2022 to enable you all plan to attend...
karibuni nyote...***

ΣΥΛΛΟΓΗ, ΚΡΕΜΑΤΙΣΤΕΣ



KOMAZA

MARKET DEVELOPMENT TO PROMOTE ADOPTION OF QUALITY SAWN TIMBER IN SECONDARY MARKETS

Anthony Ngugi
Gatsby Africa

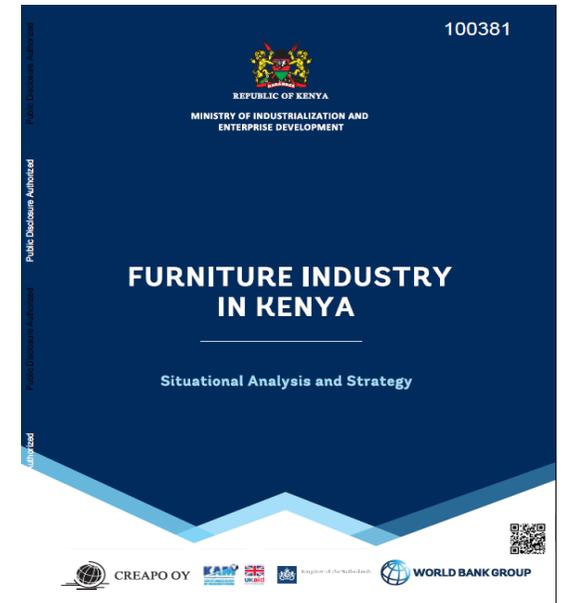
**PRESENTED AT THE COMMERCIAL CONFERENCE AND EXPO HELD ON
23 -26 November 2021**



The Kenyan secondary markets contribute significantly to local GDP and employment creation. For example, furniture revenues are in the range of USD 400k+

Example: Furniture overview

- Furniture sector estimated to employ 160,000 people across whole value chain in 2013
- Production of USD 452 million of furniture per year
- 10% CAGR over the last decade
- Kenya's industry is well positioned to expand its furniture sales domestically and regionally

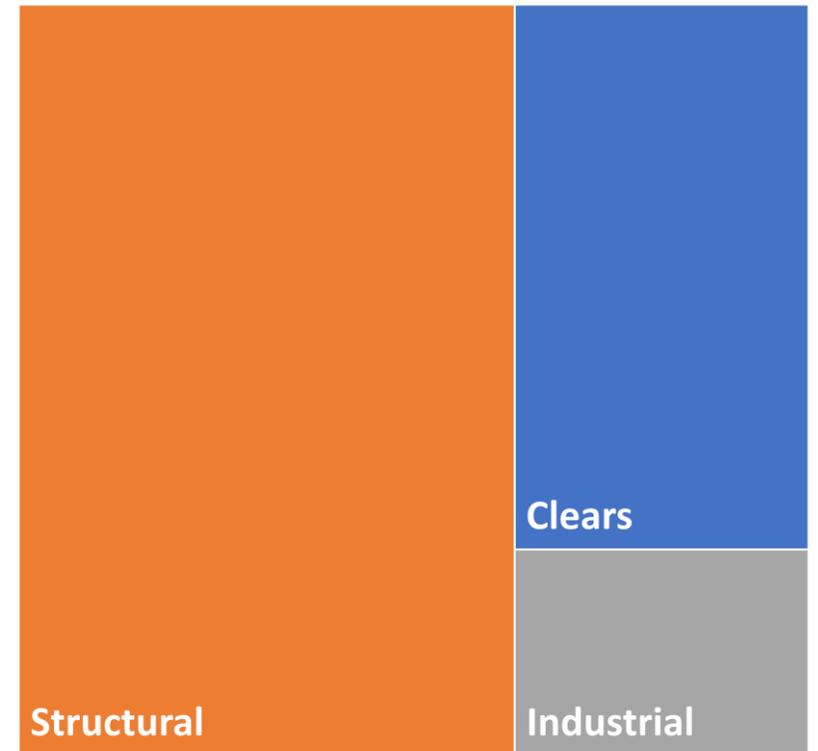


An opportunity to unlock higher value from these markets exists, linked to high value primary processing to create win-wins for players across the value chain

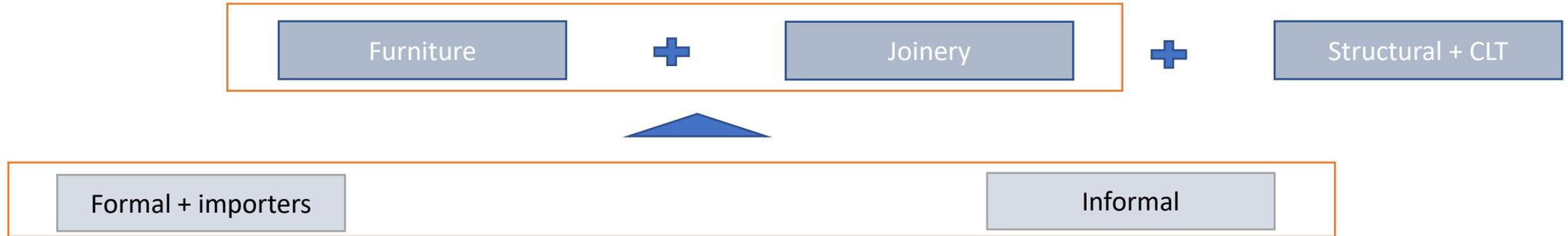
Opportunity linked to farm forestry and vertically integrated firms



Supplying markets with differentiated quality to attract higher price/ value



Broadly, local secondary markets are segmented by products and level of formalization with each segment demonstrating huge growth potential



- C. 190 furniture firms employing 10,000+ workers
- Formal furniture manufacturers estimated to be 50%
- 31 licensed importers with market share estimated to be 35%
- Imported raw material driven by quality need + growing sustainability concern
- Target markets range from low to high end
- C. 110,000+ workers employed in individually owned informal furniture businesses
- Approx. 15% of players in the furniture sector
- Target market mainly low, medium and niche markets
- Low capex, wet off saw timber
- Have advantage of flex to balance quality, price and design

But constraints limit growth and crowd out potential investments

Constraints

Formal

Informal

- Access to quality raw materials: **Key issues – moisture content, dimensional accuracy**



- Access to capital



- Feasibility planning/ choice of fit-for-purpose technologies

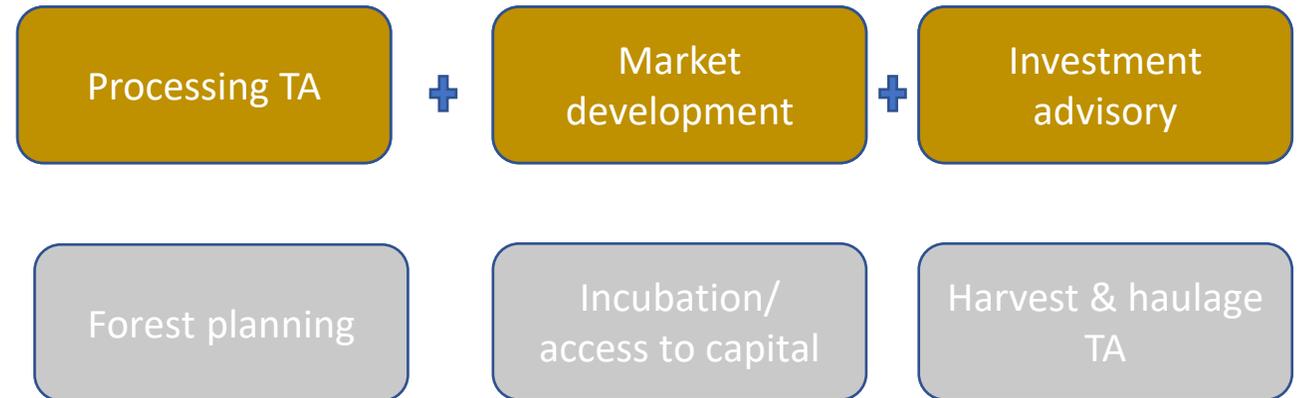


Opportunities

- Optimization of current production investments
- Adoption of new models e.g. mass furniture production
- Horizontal integration e.g. investment in thermal wood processing for outdoor furniture/ decking
- Access to finance & business incubation services



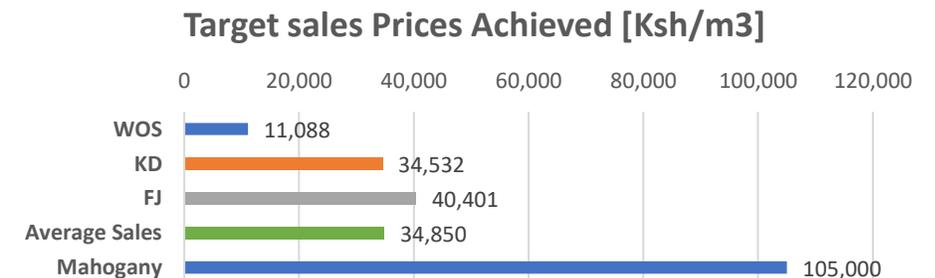
KCFP has initiated a Technical Assistance & Investment Facility (TAIF) to support value chain players overcome constraints



...In Kenya, market development is critical to support adoption of eucalyptus in secondary markets and unlock high value product processing



- Market currently using high cost raw material imports mainly from Central Africa, Europe, Russia, Canada, etc
- Processors incur high inventory costs to secure supply. Further, additional primary processing steps add to their production costs and inefficiency
- Eucalyptus presents an opportunity to substitute hardwood imports at lower cost and a higher margin proposition
- However, perceptions limit adoption but can be overcome
 - Nailability, ease of use, cracking, warping
- KCFP providing TA in design and production of high quality furniture and joinery to a consortium of partners. Thereafter, the TAIF to scale up TA



...In Kenya, market development is critical to support adoption of eucalyptus in secondary markets and unlock high value product processing...

Both processor and consumer perspectives need to be understood. A key factor is perceptions mainly among processors.

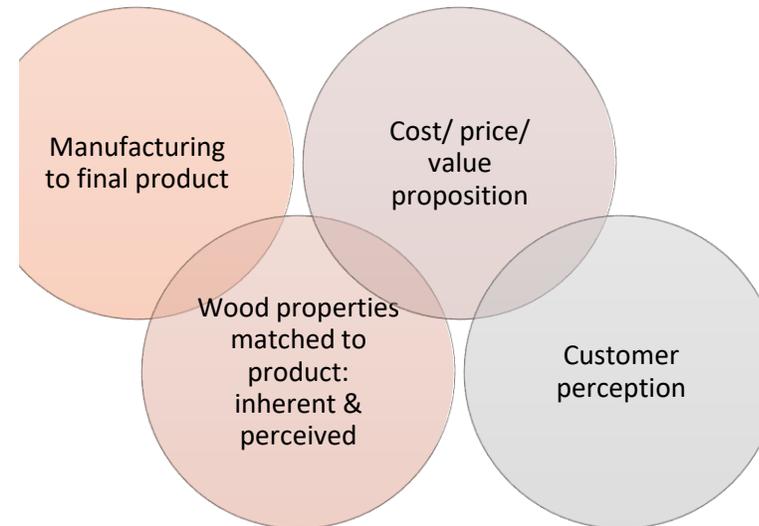


Processors

- Straight grain
- Wide variation between and within
- Color variation
- Works well
- Fine finish
- Not abrasive to tools
- Easy to glue

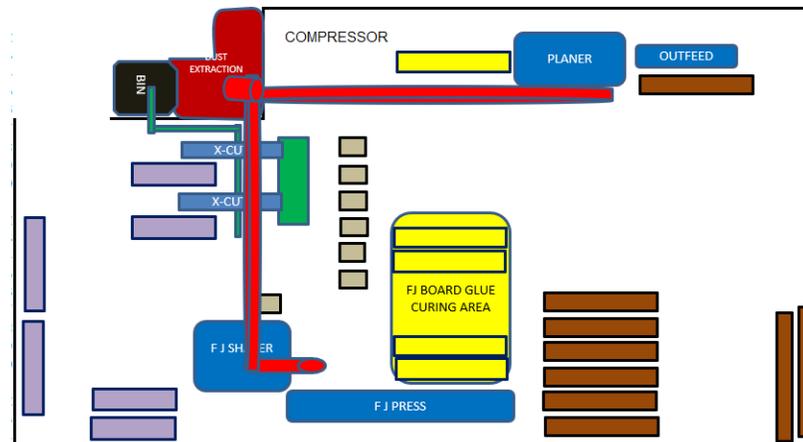
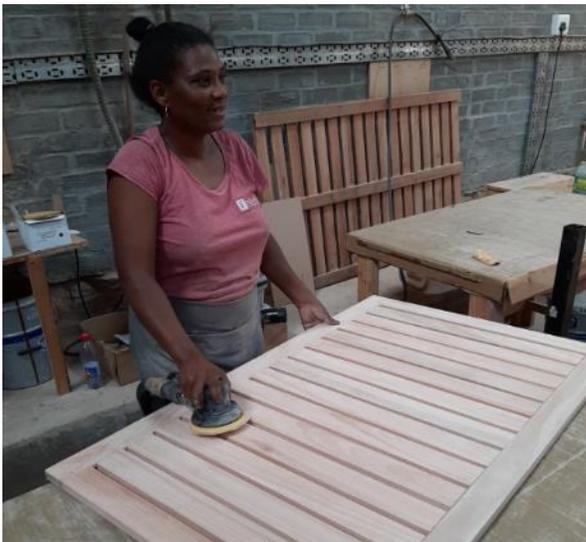
Consumers

- Need
- Trendy/fashion
- Brand name
- Value for money
- Environmental considerations
- Fit for purpose
- Price



...In Kenya, market development is critical to support adoption of eucalyptus in secondary markets and unlock high value product processing...

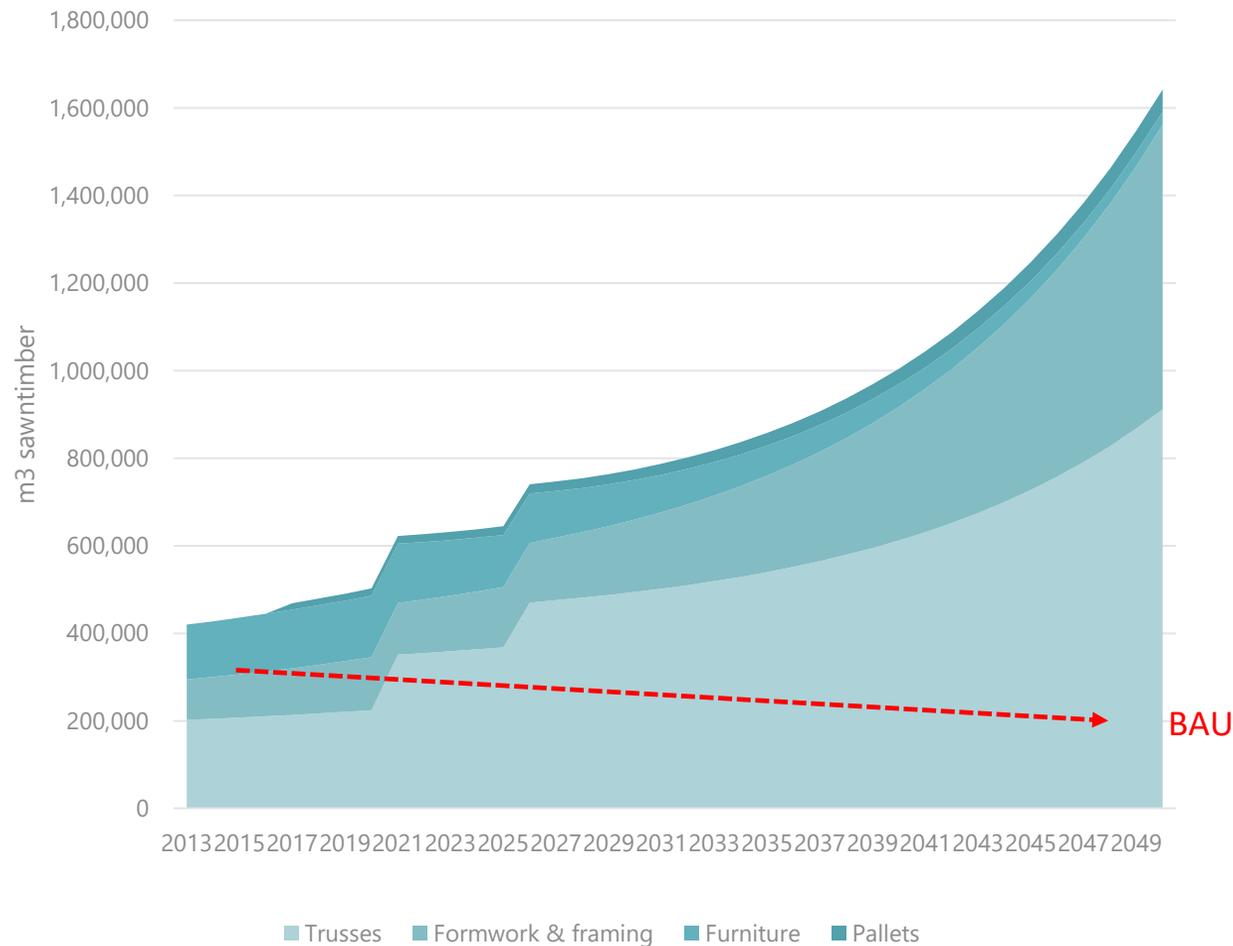
A phased approach to address investment needs (optimization/ mass production) for target markets (designs/ pricing/ etc)



- Human Centred Design for firm go-to-market strategies
- Wood property testing to demonstrate potential of local raw material & match to end products

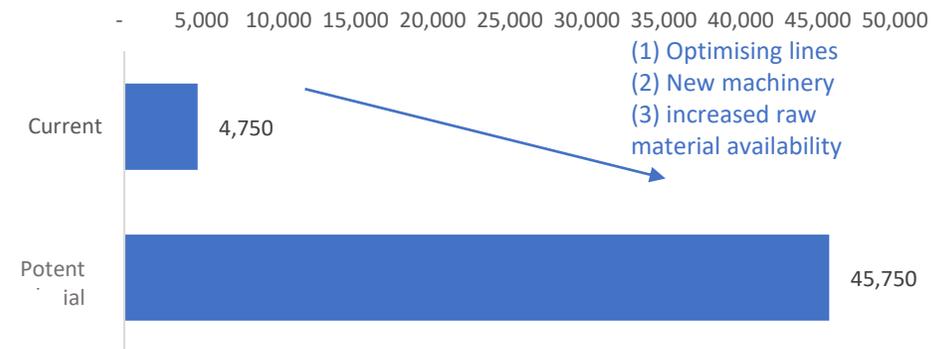
...In Kenya, market development is critical to support adoption of eucalyptus in secondary markets and unlock high value product processing

Sawn timber macro supply – demand projection



- An increasing supply deficit driven by ↑ population, urbanisation, purchasing power and a stagnating supply base, means markets likely to remain strong & opportunity for eucalyptus lumber to ↑ market share
- KCFP is currently working with initial group of 4 secondary processing companies operating in the furniture, joinery and mouldings markets. **Current wood demand** for these firms is **4,750m³/ yr**, with 50% of this being mahogany and 40% imported from as far as Canada and Europe, 10% regional timbers (Euc, cypress, pine).
- **Potential demand of 45,750m³/ yr** reflects new uptake after production improvements and supply availability

Annual demand for quality lumber (current 4 2° processors)



KCFP supporting first movers to invest in a range of business models utilizing high quality sawn timber

Depending on target market and access to capital, firms are aiming for higher profitability driven by raw material substitution, optimal processing technologies and right product positioning



OSLO PEBBLE COFFEE TABLE
R4,850.00 – R5,650.00



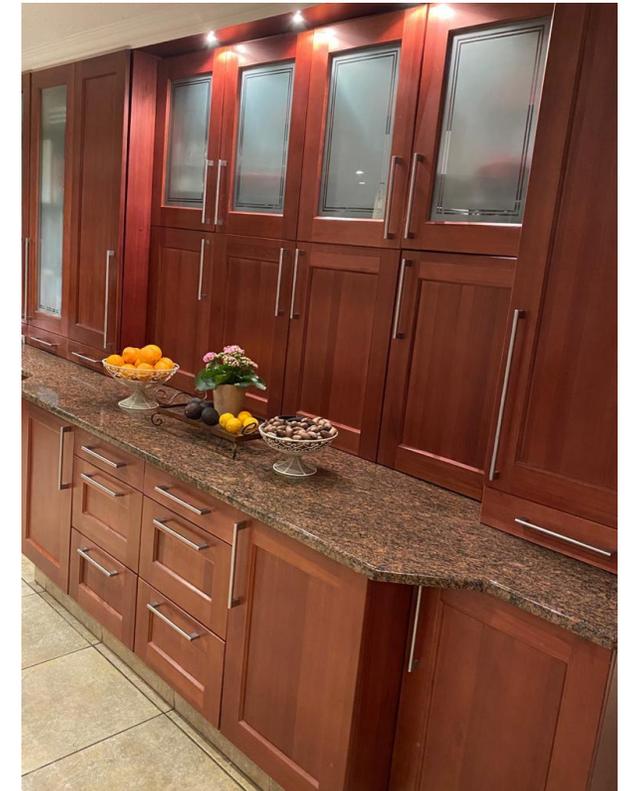
COVE COFFEE TABLE
R2,400.00 – R5,275.00



TRESTLE COFFEE TABLE
R7,795.00 – R8,975.00



BJORN OCCASIONAL SIDE TABLE
R1,950.00

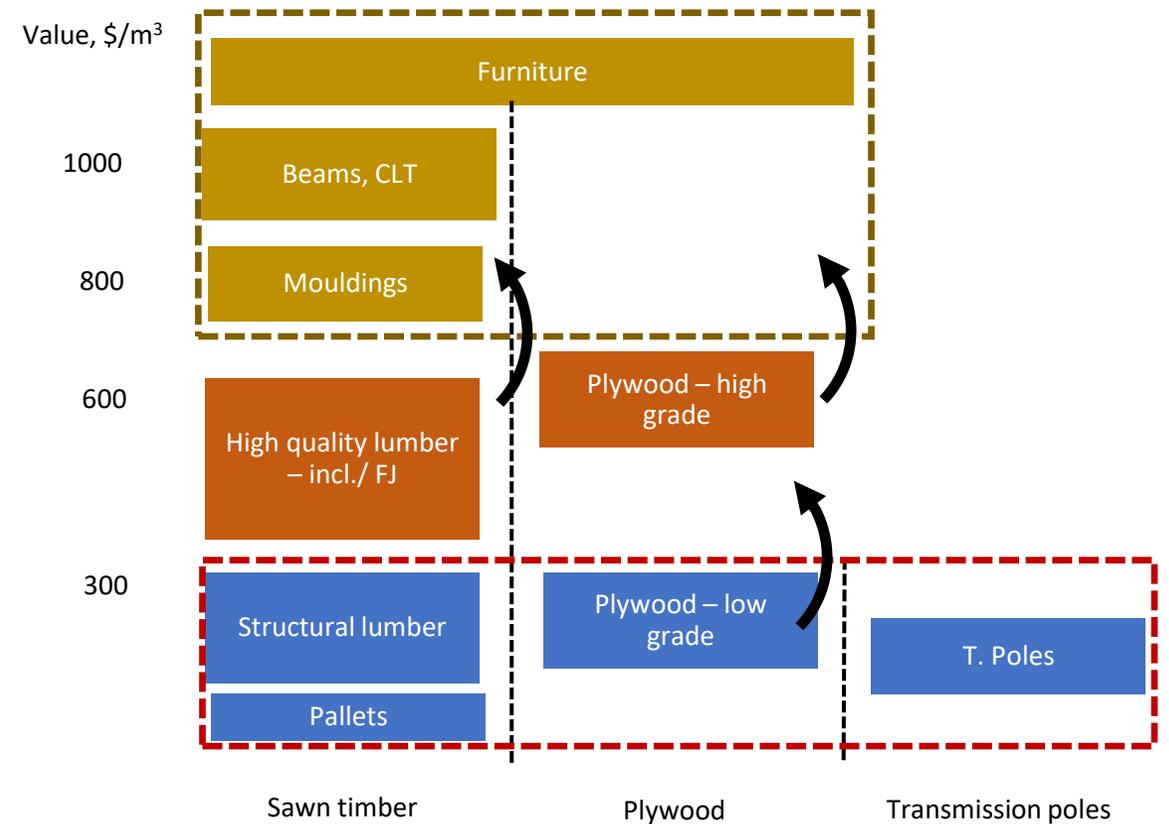


KCFP supporting first movers to invest in a range of business models utilizing high quality sawn timber

Skill development at firm level key to successful adoption. At industry level, artisan training and business incubation services could further support growth. KCFP through the TAIF exploring service models e.g. delivery of training through partnerships with industry players keen to invest in skill development



And in turn create demand for high quality primary product, with significant upward price signals in the value chain, and demand for quality planting with +ve contributions to Kenya's 10% forest cover



Thank You

Q & A