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Commercial
Forestry

Lessons from 30 years of African commercial forestry investments and implications for the future

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This report was adapted by Nick Embden and Kesiah Roe on behalf of Gatsby Africa, based on a research paper developed by Wellspring Development, Criterion Africa Partners and Gatsby Africa. Report review and input provided by Jack Steege and Quiller Brooke.

1



Executive Summary

The coming decades are predicted to bring significant demographic, environmental and economic changes to the African continent. By 2050, there will be 2 billion people living in Africa, half of whom will be found in the continent's rapidly growing cities. As populations grow, demand for wood, housing, food, energy, and jobs will grow with them, increasing pressure on existing natural resources, economies, and infrastructure.

Sustainable planted forests could play a critical role in meeting these demands, driving Africa's economic development while simultaneously making a significant contribution to mitigating climate change.

Increasing regional and global demand present an opportunity to expand Sub-Saharan Africa's sustainable planted forests. Globally, demand for wood is projected to rise by 36% by 2050. Meeting this demand will require an additional 33 million hectares of sustainable planted forests. While Sub-Saharan Africa is predicted to produce a surplus of wood, production is currently unable to reach higher value markets.



Globally, demand for wood is projected to rise by 36% by 2050, requiring an additional 33 million hectares of sustainable planted forests.



There is an opportunity for Sub-Saharan Africa to meet these demands by industrialising its processing capacity, accessing more diversified and secure markets, increasing investment returns and attracting new sources of capital as a result. The potential impacts of this are widespread, enabling sustainable planted forests to play a crucial role in decarbonising its downstream industries such as the regions rapidly growing construction sector, a sector which globally accounts for 39% of emissions, while providing alternative sustainable sources of wood supply to high employment sectors such as furniture and joinery.

Expansion of sustainable planted forests could also help meet Sub-Saharan Africa's growing demand for fuelwood and charcoal, while also reducing pressure on natural forests. Demand reached 652 million m³ in 2020, a total exceeding North America's industrial roundwood consumption, while emissions from charcoal alone produced an estimated 360 million tCO_{2e}, equivalent to more than a third of Sub-Saharan Africa's (excluding SA's) emissions in 2022. Coupled with more efficient charcoal production technologies, planted forests present an opportunity to reduce emissions, while limiting deforestation.

Over the last 30 years significant investments have been made in developing new sustainable planted forests to try and realise the sectors potential. However, so far, commercial investments have largely underperformed, resulting in a significant loss of investor capital.

In this study, Gatsby Africa and Criterion Africa Partners investigate the drivers of underperformance. Focusing on both industrial scale and smallholder forestry, we draw out what we believe are key lessons and their implications for the next generation of investors, development actors and governments.



Key findings

1. Early investments in Sub-Saharan Africa focused on developing industrial-scale planted forests, with limited investment in industrial assets.

The 1970s saw donor organisations make initial investments into industrial scale sustainable planted forests, followed by commercial investors in the 1990s and 2000s. Since 1990, \$1.4 billion has been invested to establish 190,000 hectares across 7 countries, amounting to an estimated average cost of \$6,437/hectare, ranging from \$9,615 to \$2,667 across projects. Despite these efforts, the sector remains nascent, and the value chain remains undeveloped.

Comparing Sub-Saharan Africa to the more advanced sectors of South Africa and Asia shows the importance of industrial development and market access. In Asia, DFIs and commercial investors have directed investment toward industrial processing and value addition, in turn creating market signals stimulating smallholder investment in planting and roundwood production. Growth in smallholder forestry in Asia was also underpinned by the structure of the Asian economy such as its large consumer base.

In Sub-Saharan Africa, only 11% of capital deployed has focused on downstream processing opportunities, leaving routes to market underdeveloped, and confining producers to lower-value markets.

2. Industrial scale greenfield investments in Sub-Saharan Africa have not met upfront expectations.

The sector as a whole continues to struggle with structural issues. However, data analysis and key informant interviews also uncovered a range of recurring challenges faced by investors.

Key challenges faced by greenfield investments:



Inexperienced project sponsors and management teams



Technical challenges with the development of forestry assets



Limited development of viable routes to market and industrial processing assets



Enabling environment challenges, from export restrictions to issues with license to operate



Misaligned capital structure and investors expectations



High cost of capital combined with currency depreciation



Over \$1.4bn has been invested into the value chain since the 1990s.



Only 11% of capital deployed has focused on downstream processing.

3. Smallholder production in Sub-Saharan Africa has potential but remains largely disconnected from industrial value chains.

Like industrial scale sustainable planted forests, smallholders have also faced market access challenges, confined to low quality, low-value markets, often working with informal offtakers, or planting trees for subsistence uses. However, several countries have successfully linked smallholders to industrial operations through out-grower arrangements, both supplementing

planted forests and unlocking access to higher value markets. Although more complex, if smallholders can be linked to industrial markets, they may offer a more cost-effective supply base. To successfully navigate the complexity of smallholder production, four factors need to be in place; namely, clear ownership, technical knowledge, clear access to markets, and an enabling regulatory environment. In Sub-Saharan Africa, clear access to conducive markets is the critical constraint.



Opportunities for action

To unlock the next phase of growth, industrial processing and secure regional and international offtake markets will be critical. The last 30 years of commercial forestry investment in Sub-Saharan forestry has been challenging. But while there have been losses, some firms are on a path to profitability. New funds are being established by DFIs, and a range of financial and blue-chip companies are increasingly seeking carbon-based investments in the region.

Looking at the past 30 years, our research demonstrates that for these to succeed, there needs to be a focus on industrial processing with clear offtake markets secured, deepening access to higher value international markets using ESG compliance as a differentiator, and unlocking demand for high quality timber products in place of imports and non-timber substitutes. Commercial investors should prioritise brownfield opportunities to catalyse such industrialisation.

1. Industrial Scale Forestry & Processing

For greenfield investors, we found our research highlighted several high-impact areas:

- **Recruiting experience operators** can ensure effective decision making and execution at all stages of investment.
- **Recognising significant patient and concessional finance** will play a crucial role in achieving realistic returns.
- **Implementing effective community engagement** will play a crucial role securing social licence to operate.

- **Considering the opportunities for smallholders** to play a meaningful role in the value chain, could give investors an opportunity to potentially reduce costs and further support their social licence to operate.

2. Smallholder Production

To support smallholder expansion, research suggested a focus on the following areas:

- **Accessing diversified whole tree markets** will play a crucial role in the development of smallholder production systems. Building on this, processing and product options should be selected considering the needs of smallholders. For example, veneer producers can offer an offtake for short rotation production, while woodchip and sustainable charcoal offer potential value addition for a larger proportion of the tree. These markets can support smallholders by providing increased flexibility in rotation period and silviculture, allowing farmers to decide when to monetise their trees.
- **Developing new service delivery models**, although still underdeveloped within the sector, have the potential to further enable smallholder investments, from extension to offtake aggregation.



3. Carbon Revenues

And finally, to realise the potential presented by carbon finance, our research suggested a focus on the following:

- **Supporting access to carbon finance** has the potential to subsidise an estimated 20% or more of greenfield establishment costs and could fund the majority of smallholder establishment costs, creating an opportunity to improve the investment case of both.
- **Developing new carbon methodologies** could play a crucial role in unlocking downstream market opportunities. If carbon credits can be generated from increased use of timber in green buildings it can bolster their price competitiveness relative to traditional materials (e.g. cement, steel), for example, integrating

timber into a Kenyan mid-rise building could offer upwards of 40% lower embodied emissions relative to traditional construction methods. Carbon finance could also play an important role in making sustainable charcoal production economically viable.

- **Developing a suitable carbon regulatory environment** will be required for such carbon finance opportunities to be realised, enabling project developers to realise appropriate value for the projects, recognising carbon finance in the forestry context is more of a subsidy rather than a financial windfall.



Carbon finance has the potential to subsidise an estimated 20% or more of greenfield establishment costs.



2



Introduction



Criterion Africa Partners (“CAP”) is an independently owned private equity firm investing across the forestry value chain in Sub-Saharan Africa since 2010. The firm advises two funds with assets of US\$275 million from institutional investors including prominent European Developmental Finance Institutions and Multilateral Development Banks. The CAP team has been involved in Sub-Saharan Africa’s forestry sector since 2010 and has invested in a portfolio of approximately 200,000 ha of planted forest and related conservation lands, 550,000 ha of tropical forest concessions and several downstream industrial assets.

Gatsby Africa is a private foundation set up by Lord David Sainsbury, with a long history of engaging in East Africa across government, business, and society. We are committed to helping build stronger and more inclusive economies in East Africa through the transformation of sectors that have the potential for inclusive, resilient, and competitive growth over the long-term. We currently work in diverse high-potential sectors: Aquaculture, Commercial Forestry, Livestock, Textiles and Apparel, Water and Tea. We believe that, if successfully transformed, these sectors are capable of inspiring a step change in the region’s growth, generating hundreds of thousands of jobs and additional incomes.

Gatsby Africa considers the Commercial Forestry sector in East Africa to have enormous potential for growth and value addition. We employ a systems approach to industry development, working with industry in pre-competitive areas of research and development, providing innovation financing to entrepreneurs in the sector, unlocking public-private partnership opportunities and necessary structural reforms in the sector.

This study aims to derive a key set of lessons from commercial forestry investments in Africa since 1990, with a focus on industrial-scale planted forests development and smallholder forestry. Significant investments have been made in developing new sustainable planted forests to try and realise the sector's potential. However, so far, commercial investments have largely underperformed, resulting in a significant loss of investor capital.

The objective of this study is to examine why this is the case. We unpack the main challenges faced by investors, demonstrating how DFI and non-DFI backed investments can catalyse the sectors growth. The study examines a) how a range of industrial planted forest investments have played out (including public-backed, private-backed, and new era DFI investments) and b) Sub-Saharan Africa's smallholder forestry activity, including opportunities to scale and routes to markets.



Definitions

- **Global forests:** A holistic term to cover all forest types, including natural forests as well as planted forests. It refers to both for restoration – whereby trees are not planned to be harvested – and production, whereby trees are grown specifically with the intent of harvesting to produce timber products, including agroforestry systems.
- **Commercial forestry:** The whole forestry value chain from sustainable planted forests through to processing and value addition.
- **Sustainable planted forests:** Planted forests with the principal objective of timber production, but that have been developed with environmental and social considerations taken into account.
- **Industrial-scale planted forests:** Large-scale sustainable planted forests developed by project sponsors. In the Sub-Saharan Africa context this is typically in the range of 2,000 – 10,000+ ha.
- **Smallholder forestry:** Sustainable planted forests for timber production developed by private individuals or small firms. These are typically in the range of <1 ha to several hundred ha but can vary from place to place.

3



Methodology

The study's methodology had **three main components**:

1

Reviewing proprietary data from CAP

- CAP has aggregated data from its own market research and portfolio of past investments between 1993 and 2022.
- The data includes investment amounts, investor base, level of industrialisation, financials, species mix, growth rates and age class profile, capital structure and indicative carbon stock analysis of individual projects, including the relevant investments made from its own funds including Global Woods (Uganda), KVTC (Tanzania) and SFI / Form Ghana (Ghana).
- In addition to reviewing the data, the CAP team have been interviewed on past investments and on key lessons learnt. CAP has also shared their presentation on past investments, the role of carbon finance and market related data on the global and African forestry sector.
- CAP has also supported financial modelling to understand the carbon impact of past projects and precedent valuations in the sector.
- Gatsby shared proprietary reports on a Gatsby-funded tree growers' associations initiative, the organization's assessment of feasible wood processing investment facilitation mechanisms in Africa, and other documents of relevance within the Gatsby Forestry portfolio.
- Data from Gatsby also included carbon models and analyses.
- In addition to reviewing the data, the Gatsby team have been interviewed on their vision for commercial forestry sector transformation in EA including smallholder opportunities in Africa, investments to date, and key lessons learnt.



2

Desktop review of existing papers



Desktop review of existing literature on forestry projects in Africa (both parastatal and privately owned) and carbon projects.

The following key public research material have been reviewed in relation to lessons learnt from the history of commercial forestry:

- The State of the World's Forests (FAO and UNDP, 2020).
- Forest Plantations in Sub Saharan Africa (Chamshama and Nwogu, 2004).
- Financing of Sustainable Forest Management in Africa: An Overview of the Current Situation and Experiences (Gondo, 2010).
- Towards Large-Scale Commercial Investment in African Forestry A Study for the Climate Investment Funds Evaluation & Learning Initiative (African Development Bank, 2019).
- The Plantation Forestry Sector In Mozambique: Community Involvement And Jobs (Almeida and Delgado, 2019).
- Assessing the Investment Climate in the Planted Forest in Mozambique (Stellenbosch University, 2005).
- Carbon Standard in the Voluntary Carbon Market (Verra, 2024).

As well as the above listed documents, a desktop review of existing literature on small hold forestry projects in Africa was conducted. Including research papers, articles, and case studies on existing projects in Africa and Asia.

The following key public research material have been reviewed in relation to lessons learnt in relation to small holder forestry:

- The State of the World's Forests (FAO and UNDP, 2020).
- Allocating Capital for Maximum Impact in Africa's Plantation Forestry Sector (CAP and Indufor, 2017).
- Four Keys to Smallholder Forestry (Byron, 2001).
- Hidden assets: Asia's smallholder wood resources and their contribution to supply chains of commercial wood, Australian Forestry (Midgley et al, 2017).
- Profitable partnerships: smallholders, industry, eucalypts and acacias in Asia (Midgley et al, 2022).

We also reviewed case studies from specific projects across Africa and Asia. These studies are used to draw information, qualitative and quantitative, to make comparisons between the two regions, identify key differences and expected challenges to achieving smallholder forestry in Africa, when compared to Asia.



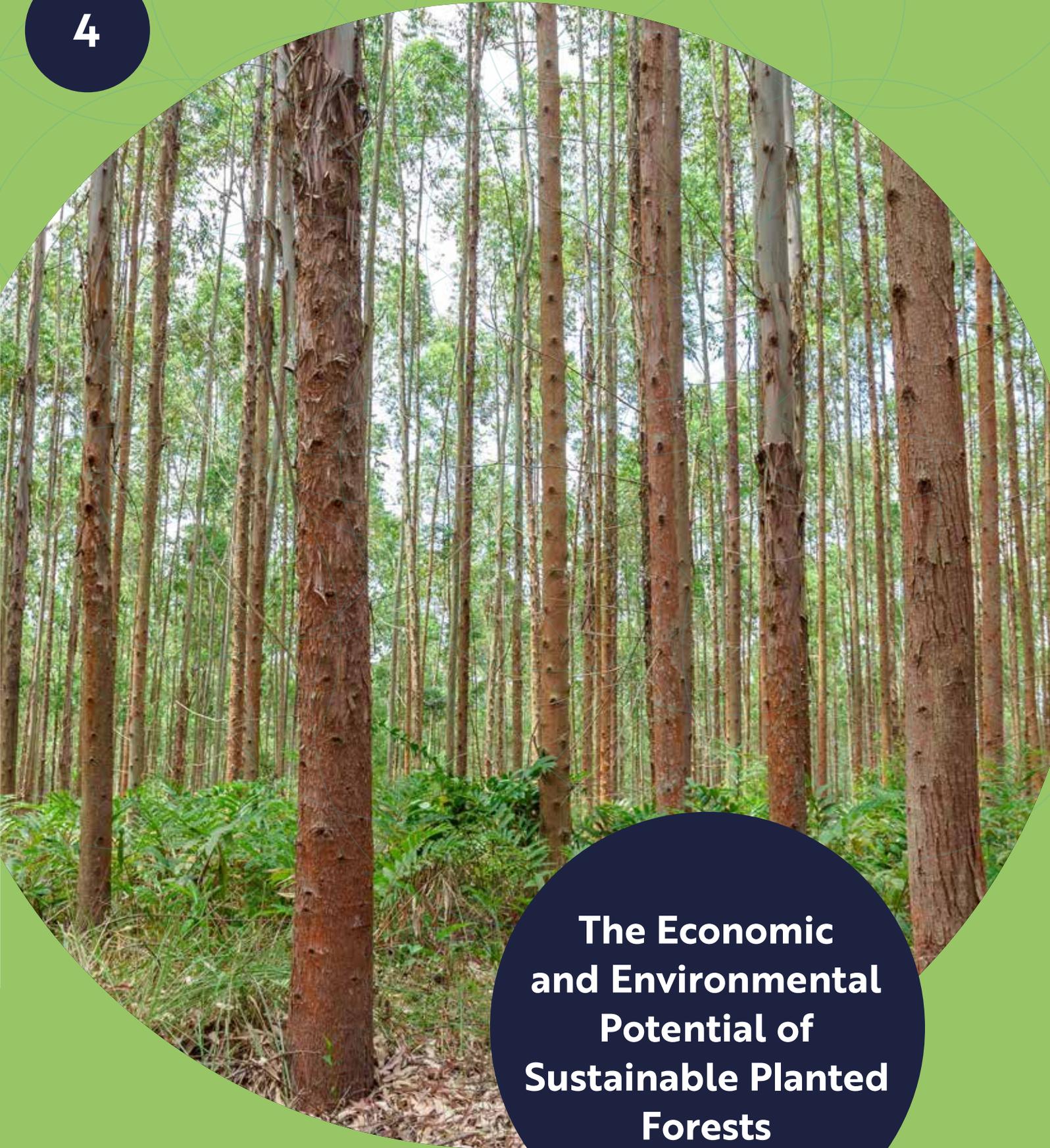
A range of key informant interviews were undertaken including current and past CEOs, DFIs, non-DFI investors and leading development consultants.

3

Interviews with various stakeholders

- The following key stakeholders have been interviewed to understand key challenges and lessons learnt from the history of commercial forestry projects:
 - Sponsors: Key sponsors of some of the projects who understand how projects were conceived, and their initial financing and challenges.
 - Management: Current and past CEOs of forestry companies who have also provided outlook on market and the role of carbon finance.
 - DFIs: A number of DFIs who are active investors in the sector, including current and past investment professionals.
 - Non-DFI investors: Non-DFI Investors including individuals, family offices and impact investors provided a large portion of financing during the historical period (1993-2022).
 - Leading development consultants and service providers: Pioneers of smallholder planted forests development research and technical assistance in Africa and Asia to understand learnings on constraints, incentives (including different models of SME producer engagement) and success factors. These interviews were used to demonstrate findings within specific contexts – showing comparisons between African and Asian smallholder planted forests development.
- Inclusive forestry businesses: Key sponsors of some of the projects to understand project conception, initial financing (including funding mechanism and key actors), theories and visions for smallholder planted forests development in Africa, and reflections from progress to date, especially regarding challenges faced.
- Output from the interviews has been aggregated to summarise smallholder forestry models being adopted, different archetypes of these models, and key lessons learnt.

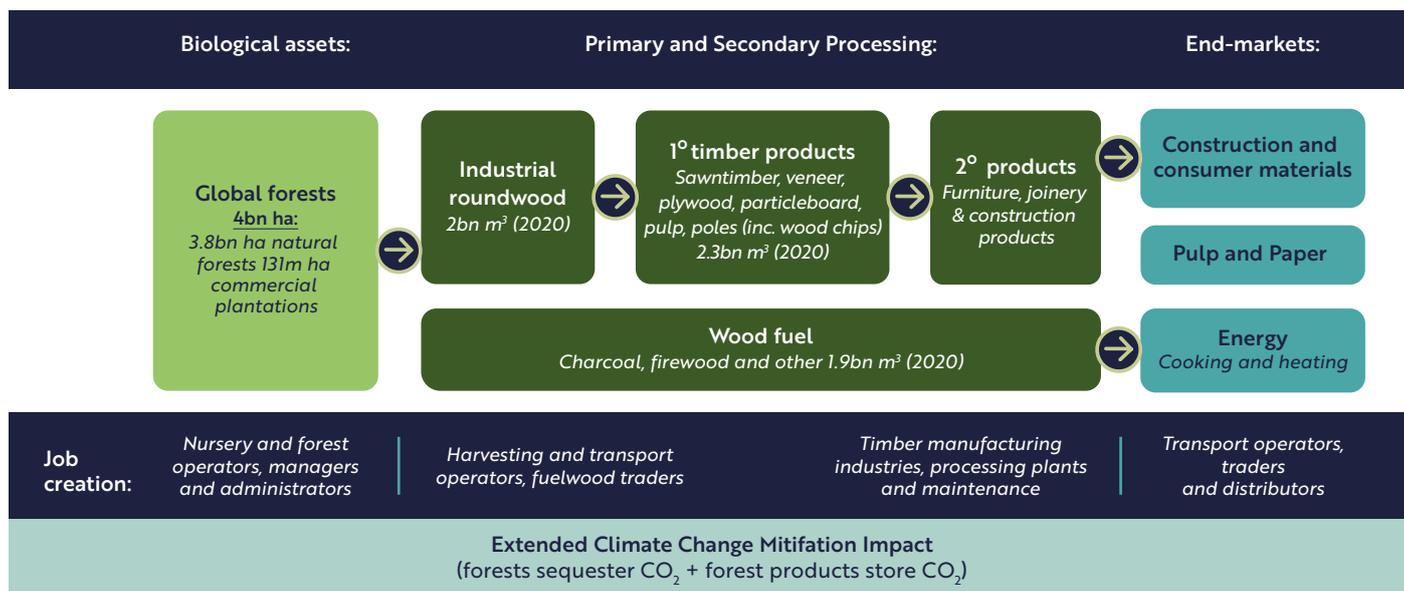
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**The Economic
and Environmental
Potential of
Sustainable Planted
Forests**

The Economic and Environmental Potential of Sustainable Planted Forests

Sustainable planted forests can play a critical role in economic development. Globally forests produce over 5,000 types of wood-based products, generating around \$600 billion annually, equating to roughly 1% of global GDP. They are a key economic resource, with 1.6 billion people worldwide depending on forests, both directly and indirectly, for their livelihoods, food, fuel, timber, jobs, and shelter.



If managed effectively, these economic opportunities can unlock a range of climate change mitigation impacts, possibly giving commercial forestry one of the highest emission mitigation potential when compared to other landuse alternatives.



According to the FAO, there are three interrelated pathways forests can take to support economic development and environmental recovery:

- **Reducing deforestation degradation** through creating increased supply of wood and reducing pressure on natural forests. This could avoid emitting 3.6 +/- 2 gigatons of carbon dioxide equivalent (Gtco_{2e}) per year between 2020 and 2050, including 14% of global mitigation needed to achieve
- **Restoring degraded lands** through sustainable productive forests, afforestation and reforestation (of planted forests and natural forests) and smallholder forestry systems, including agroforestry. This could cost-effectively take 0.9-1.5 Gtco_{2e} per year out of the atmosphere between 2020 and 2050. 1.5 billion ha of degraded land would benefit from restoration, while increasing tree cover into agroforestry systems could boost agricultural productivity for another 1 billion ha. 1.5/ 2°C targets set by the IPCC, while safeguarding more than half the world's land-based biodiversity.
- **Sustainably using forests and building green value chains** would help to meet future demand for materials. For instance, timber construction materials (e.g., cross-laminated timber, with captured CO₂ storage) can be substituted for non-renewable, traditional building materials such as steel & concrete. The global construction sector accounts for 39% of emissions and retrofitting and decarbonising buildings could save up to 2tco_{2e} per m³.



Commercial forestry has the possibility to **support all three pathways** by:

1

Increasing supply of sustainably grown wood and in turn easing pressure on natural resources by substituting unsustainable timber use.

2

Restoring degraded lands through sustainable productive forests, agroforestry, and smallholder systems.

3

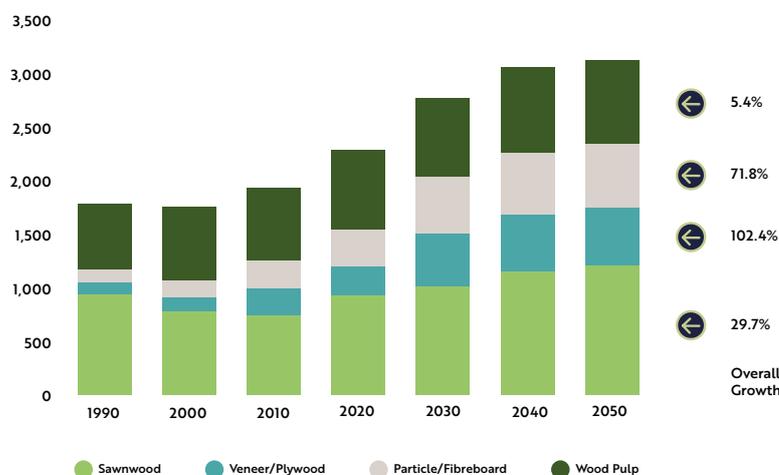
Supplying sustainably grown timber to build green value chains, providing opportunities to store carbon downstream and avoiding the use of more carbon intensive alternatives.



Increases in regional and global demand present an opportunity to meet Sub-Saharan Africa's full impact potential

Global demand is expected to increase by 36% to 3.1 billion m³ in 2050, driven by demand for wood-based panels such as veneer, plywood, and particle / fibreboard in the construction sector and consumer products.

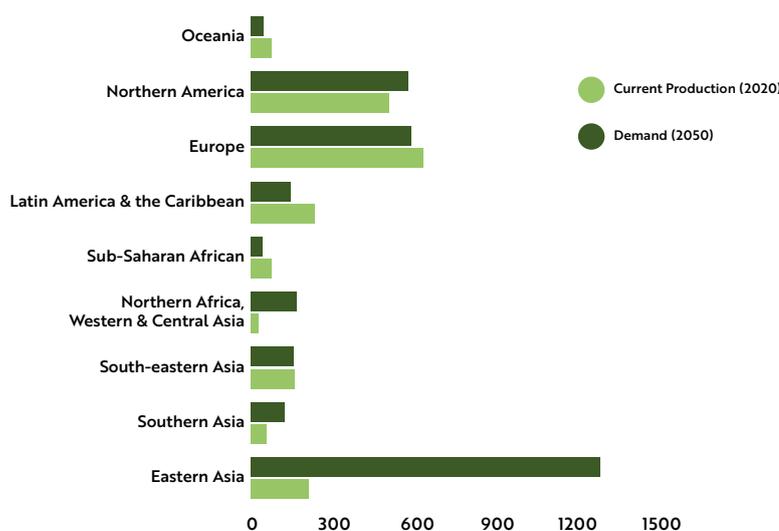
Global projected consumption of RWE wood products (2020–2050)



Production is currently dominated by Europe and North America who produce 60% of the 2.3 billion m³ that is currently being consumed. Sub-Saharan Africa is still a small player, producing 70 million m³ on 5% of the world's planted forests.

However, increased global demand, expected to be driven by East Asia, will require an increase by 55% or 1.1 billion m³ in production of industrial roundwood, equivalent to an additional 33 million hectares of sustainable planted forests.

Projected demand in 2050 vs. production in 2020 by region (roundwood m³)





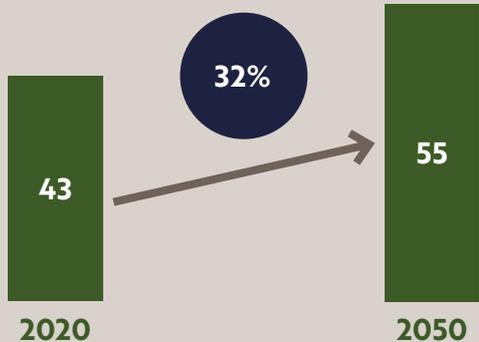
Industrial processing and market development will play a crucial role in realising this



While Sub-Saharan Africa is predicted to produce a surplus of wood, production is currently unable to reach higher value markets. Industrialising Sub-Saharan Africa’s processing capacity will play a crucial role in allowing the continent to meet these demands, unlocking access to more diversified and secure markets, increasing investment returns, and attracting new sources of capital as a result.

This in turn could create new opportunities for Sub-Saharan Africa’s sustainable planted forests to provide more competitive products for downstream industries. For example, providing high-quality inputs for new sustainable timber construction systems, including mass timber. The FAO estimates that wood consumption in Sub-Saharan Africa could increase by 32% if 20% of housing needs are met using mass timber by 2050.

Scenario: Wood consumption in Sub-Saharan Africa may increase by 32% on an annual basis in a scenario where 20% of housing needs are met using mass timber in 2050



Consumption of sawnwood, veneer, and plywood (RWE million m³) in 2050

Based on FAO inputs, assuming a 20% share of new urban housing in 2050 in Sub-Saharan Africa is built using mass timber and implied raw material components (veneer, plywood and sawn timber).

The potential impacts of this would be widespread, enabling sustainable planted forests to play a crucial role in decarbonising its downstream industries such as the region’s rapidly growing construction sector, a sector which globally accounts for 39% of emissions.

Construction would be one of several industries impacted, with increased primary processing capacity providing alternative sustainable sources of wood supply to other high employment sectors such as furniture and joinery which currently rely on unsustainable timber use.



Sustainable planted forests could provide a solution to unsustainable charcoal and deliver significant climate impact

Based on FAO data, global consumption of **fuelwood** is also increasing rapidly, jumping by over 100 million m³ between 1990 and 2020. This growth has been driven by the usage of woodfuel as a primary source of energy for cooking and heating in Africa and Southern Asia. Africa is the largest consumer of woodfuel with 652 million m³ consumed in 2020, representing more than 1/3 of the world’s demand and exceeding North America’s industrial roundwood consumption.

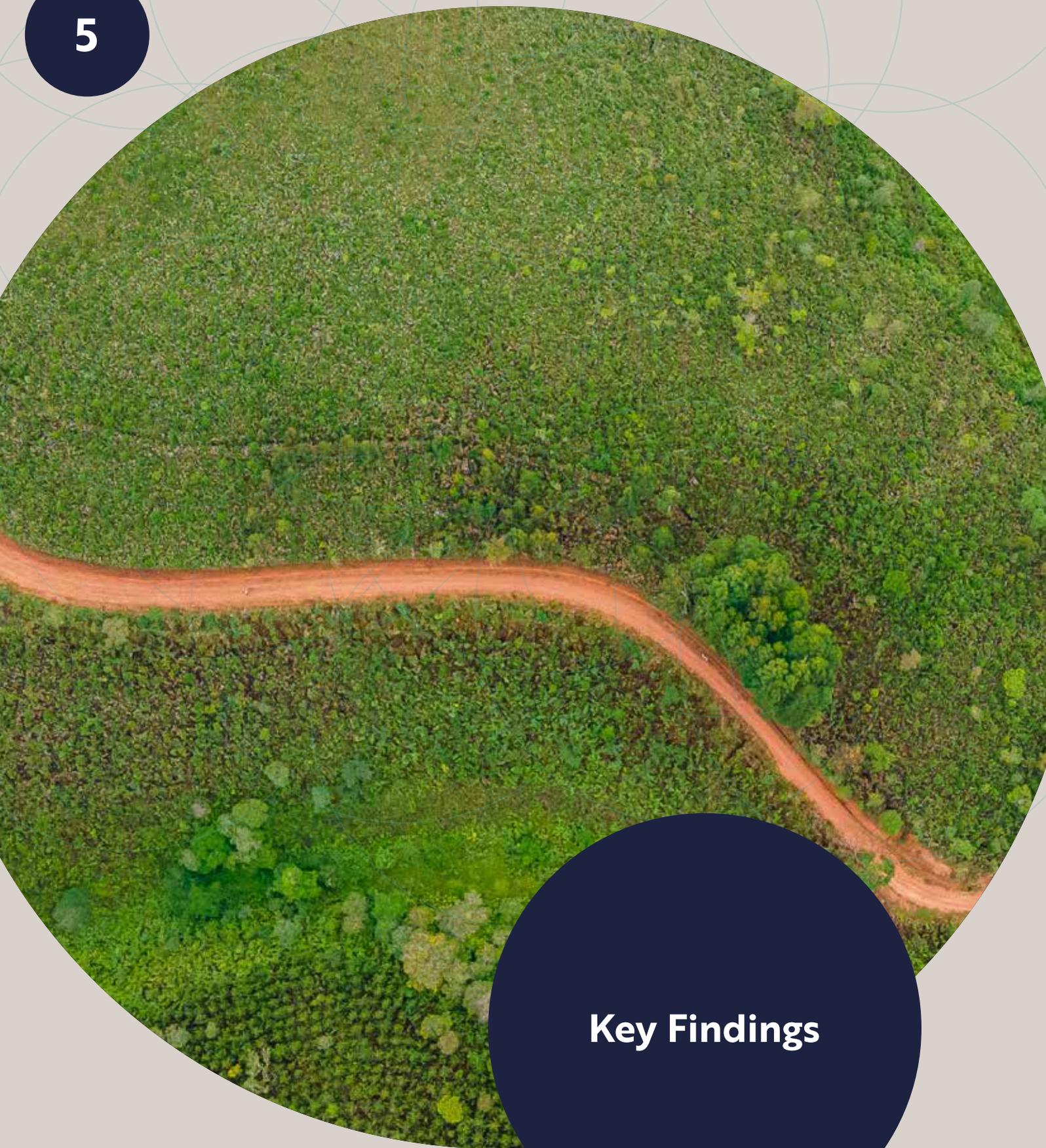
Regional consumption of wood fuel by region in 1990 and 2020 (millions m ³)			
Region	2020	Growth ('90 – '20)	CAGR ('90 – '20)
Eastern Asia	171	(42.0)%	(1.8)%
Southern Asia	377	8.6%	0.3%
South-Eastern Asia	142	(41.5)%	(1.8)%
Northern Africa, Western and Central Asia	76	84.0%	2.1%
Sub-Saharan Africa	652	58.1%	1.5%
Latin America and Caribbean	229	13.5%	0.4%
Europe	170	8.4%	0.3%
Northern America	101	(17.9)%	(0.7)%
Oceania	10	6.4%	0.2%
Total	1,928	5%	0.2%

In Sub-Saharan Africa approximately half of woodfuel is used to make charcoal, predominately from natural forests and via traditional methods, leading to significant deforestation and conversion of natural woodlands to agricultural land. Inefficient earth-mound kilns require approximately 10m³ of wood to produce 1 ton of charcoal, releasing average emissions of 10 tco_{2e} per ton of charcoal produced. This makes Africa’s current production

of 36m tonnes of charcoal, equivalent to 360m tco_{2e}, more than a third of Sub-Saharan Africa’s (excluding South Africa’s) total emissions in 2022.

Coupled with more efficient charcoal production technologies, planted forests present an opportunity to meet growing woodfuel demands, reducing emissions and pressure on natural forests.

5



Key Findings



Early investments in Sub-Saharan Africa focused on developing industrial-scale planted forests, with limited investment in industrial assets

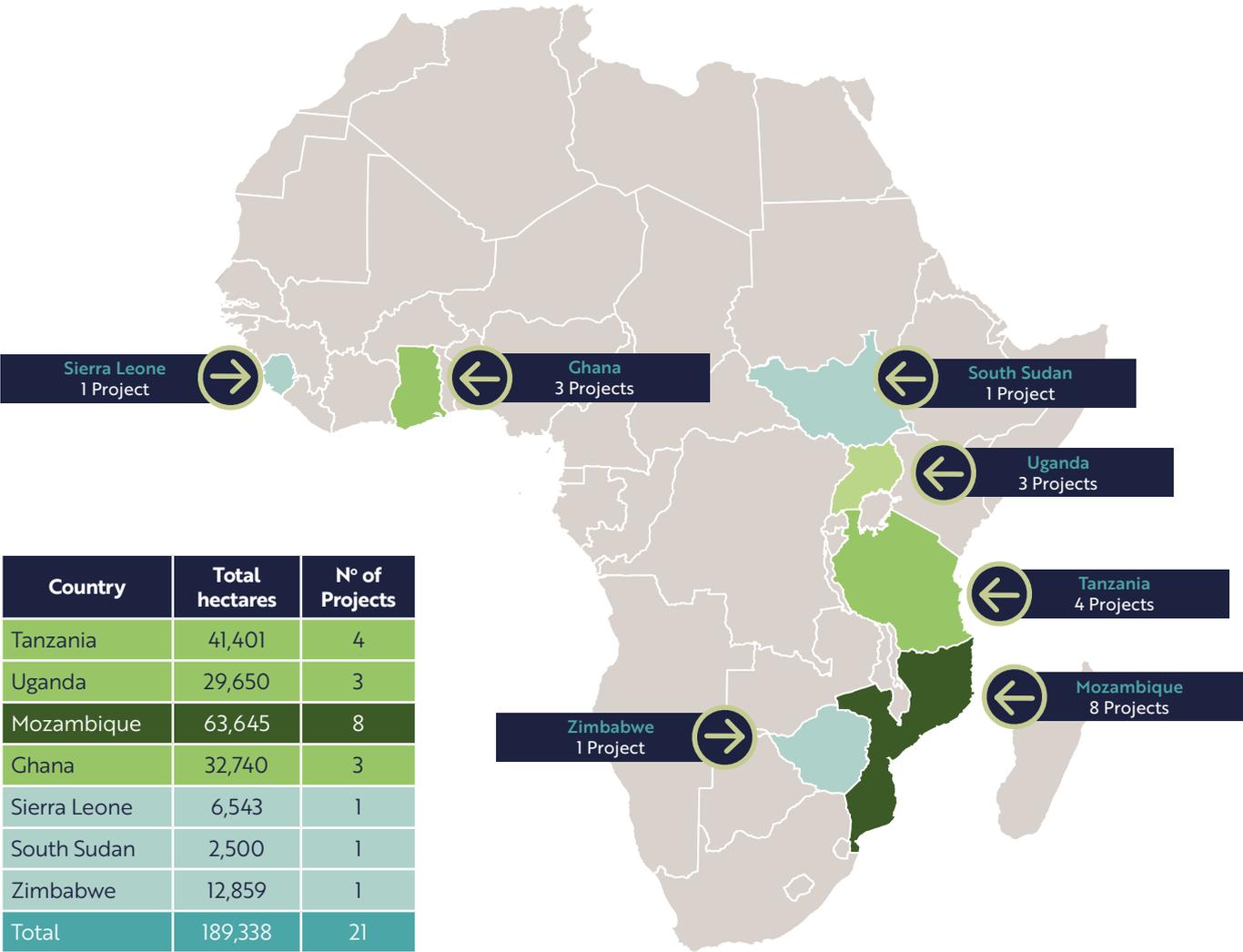


\$1.4bn has been invested since the 1990s to establish 190,000 ha of sustainable planted forests, with 11% allocated to industrial investments.

The 1970s saw donor organisations make initial investments into industrial scale sustainable planted forests, followed by commercial investors in the 1990s and 2000s. Since 1990, \$1.4 billion has been invested to establish 190,000 hectares across 7 countries. These figures exclude projects in South Africa, parastatal planted forests, tropical forestry that is based on government concessions, REDD+ projects and smallholder projects.

Investors have targeted a wide spectrum of markets including sawn timber, utility poles, plywood, biofuel, pulp, and wood chips for export. 50% of the planted forests were planted with eucalyptus varieties that would have a shorter rotation cycle than other species. Pine accounts for 30% of the total area established with a focus on sawntimber markets. Out of 21 projects developed, there are now 15 forestry companies that are operational and would be considered as brownfield companies.

Footprint of projects in Sub-Saharan Africa by country, region and species



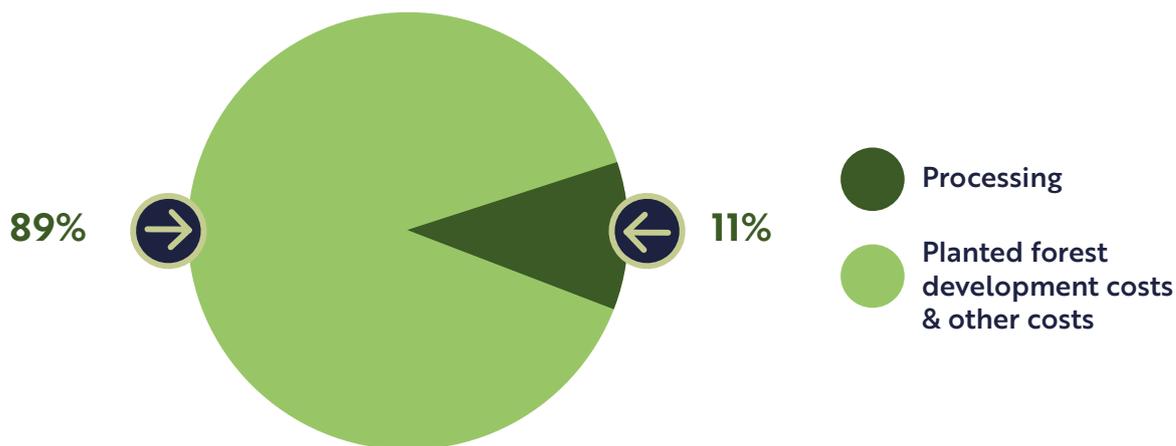
CAP’s data shows significant capital deployment from 2007 onwards, with 80% of the c.1.4bn deployed after 2007. More than 70% of funding concentrated in developing greenfield projects in Mozambique, Tanzania and Uganda, and the estimated average cost is \$6,437/hectare, ranging from \$9,615 to \$2,667 across projects.

Despite these efforts, the sector remains nascent, and the value chain remains undeveloped. Comparing Sub-Saharan Africa to the more advanced sectors of South Africa and Asia shows the importance of industrial development and market access. In Asia, DFIs and commercial

Investment costs profile of greenfield projects on per ha basis		
	All-in	Excl. Industrial
Average	6,928	6,437
Lowest	3,022	2,667
Highest	9,615	9,615

investors have directed investment toward industrial processing and value addition, in turn creating market signals stimulating smallholder investment in planting and roundwood production.

Investments in processing vs. planted forest and other costs (1993-2022)



In Sub-Saharan Africa, only 11% of capital deployed has focused on downstream processing opportunities, leaving routes to market underdeveloped, and confining producers to informal and lower-value markets.

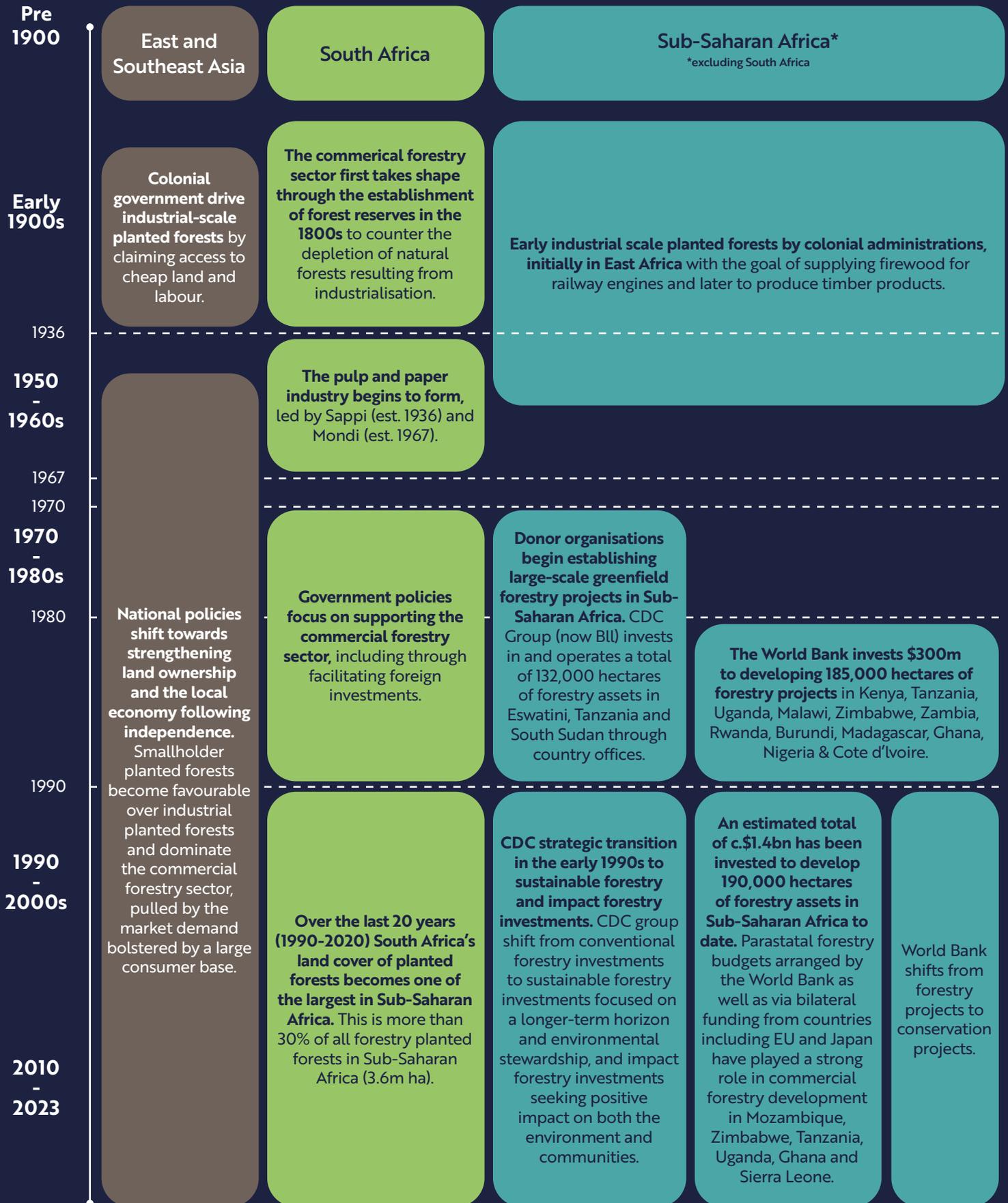
Research showed some projects had insufficient plans at inception to invest in downstream processing, expecting that a planted forest at scale could catalyse downstream processing through other operators. However, this did not happen, and as a result projects had to vertically integrate into processing over time to create routes to market. Two thirds of greenfield projects have now vertically integrated, starting the sector's industrialisation.

Companies are now increasingly making processing investments targeting diversified export markets with a focus on plywood and veneer. Exports can help mitigate local currency risks through sales in US dollars, and highlights that projects could be cost-competitive globally.

The sector as a whole continues to struggle with structural issues caused by a lack of downstream processing. However, data analysis and key informant interviews also uncovered a range of recurring challenges faced specifically by investors (see page 28).

Lessons from 30 years of African commercial forestry investments and implications for the future

Timeline of commercial forestry across East and Southeast Asia, South Africa, and Sub-Saharan Africa showing how the sector did not develop uniformly across these regions



Key Findings

The below framework has been developed to understand key challenges impacting the development of greenfield projects in Sub-Saharan Africa

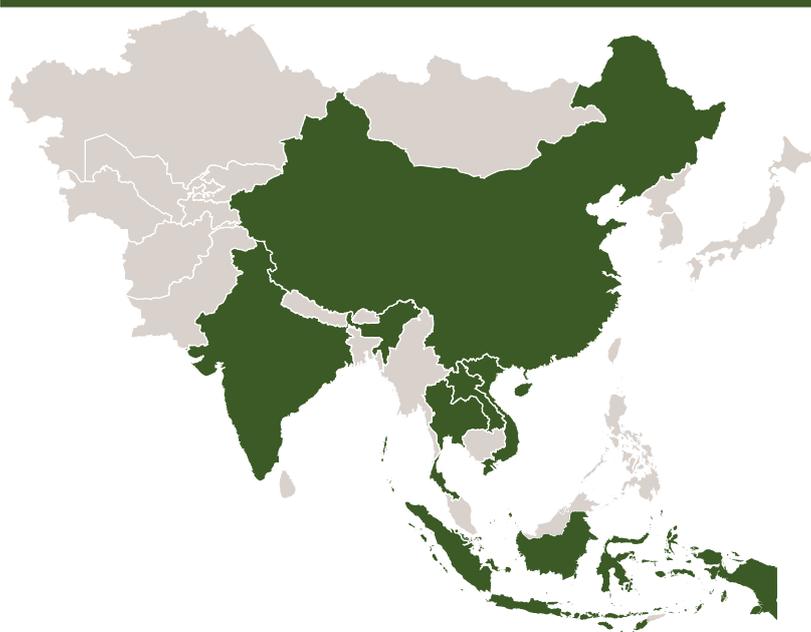
Key Elements	Summary of key findings
1. Sponsors and management	<ul style="list-style-type: none"> The majority of the 15 greenfield projects in Sub-Saharan Africa (excluding South Africa) have been led by promoters that have had a limited track record and limited experience in developing forestry projects in the region. There has been a limited involvement of strategic forestry operators in the region. This factor has been a key driver of the various challenges faced by projects as described below.
2. Development and management of forestry assets	<ul style="list-style-type: none"> Greenfield projects have faced challenges early on while developing assets such as silviculture issues and species selection, and by developing biological assets too quickly. This has resulted in quality and yield issues that have impacted projected woodflows and the monetisation of forestry assets. These factors were further impacted by unavailability of capital to maintain forestry assets. External factors such as challenges to the development of infrastructure and the non-availability of skilled labour in rural areas has led to delays and impacted the cost base.
3. Routes to market and Industrialisation	<ul style="list-style-type: none"> There has been limited development of viable routes to market by greenfield projects. There were limited plans to develop market for wood flows in initial business plans. Only 11% of the c.\$1.4bn of capital in the sector has been utilised toward developing industrial assets to facilitate the production of timber products. Looking ahead, industrialisation will be a key theme for existing brownfield forestry projects as they reach material woodflows. A key issue these projects face is competition with informal market participants who do not require high ESG standards or have a high fixed overhead structure. A key theme is developing viable export routes to Europe, US, Middle East and Asia as well as achieving diversification.
4. Enabling environment	<ul style="list-style-type: none"> Greenfield projects have faced a number of challenges related to government regulation and unfriendly business policies, including land acquisition processes and unexpected export bans that have impacted financial performance for projects which depend on exports to the region or outside of Africa. Acquisition of land in rural areas with high population density has resulted in inherent community issues.
5. Investor profiles, the role of DFIs and financial performance	<ul style="list-style-type: none"> 60% of the \$1.4bn capital deployed in 15 greenfield projects has been sourced from commercial and non-DFI investors such as private equity funds, timber asset management companies, family offices, and individuals. Over the last 10 years, capital from non-DFI investors has declined materially and DFIs have increased their share substantially. Going forward, the sector anticipates DFIs being a key source of financing, and new sources of capital are developing from carbon focused investors as a product of increased appetite for carbon offset projects. A key finding is that many projects did not have a fully funded business plan and faced multiple attempts to raise capital with investors. This led to misalignment on valuation and issuance of debt in projects that did not have established cashflows. A majority of the projects are considered immature and have yet to get to a steady-state revenue profile or enable target investor returns.
6. Valuation considerations & return expectations	<ul style="list-style-type: none"> In terms of valuations, there is a large variation on entry price on a per ha basis in Sub-Saharan Africa (excluding South Africa). Investors have paid a significant premium to invest in immature projects vs. mature projects in South Africa driven by bullish forecasts that did not materialize A key challenge to valuation of early-stage forestry projects is that material cash flows are typically back-ended due to the nature of forestry assets. These cash flows are discounted at high discount rates due to country risks. In addition, USD based investors face significant currency depreciation risks (e.g. a 10% annual currency depreciation rate of key currencies over the last 10 years) that can impact returns.



Smallholder production in Sub-Saharan Africa has potential but remains disconnected from industrial value chains

Smallholders have the potential to have a transformative impact on the sector. For example, in Vietnam alone over a million smallholders in Vietnam supply 50% of Asia-Pacific wood-chip market and around 12% of global export volume. This is a trend seen across East and Southeast Asia where the regional wood base is primarily supplied by SME producers.

Key projects in East and Southeast Asia



Plantation Timber Products (PTP): 200m trees planted by an estimated 360,000 SME producers. Leading producer of high-end wood panel and laminate flooring in China. The company received DFI funding from IFC as well as private capital from individual investors.

Vietnam: supplies more than 50% of the Asia-Pacific hardwood woodchip market (Margules Groome, 2022) and approximately 12% of the total world export volume (GTA data, 2022). In 2020, Vietnam's export earnings on wood products were USD 12.4 bn.

Vietnam: 1.9m ha planted forest are managed by more than 1 million SME producers. Wood is sold into a reliable local market which feeds the country's wood industry.

India: 6.4m ha Eucalypt trees have been planted by millions of SME producers. Wood is sold as wood fuel, pole, sawn timber, and as raw material for the pulp industry.

Lao PDR: 25,000 ha of smallholder planted forest supply large commercial players. Government supported initiatives facilitate these agreements between large players and SME producers.

Sri Lanka: SME producers are estimated to provide over 40% of the country's sawlog supply, 26% of the biofuel production, and a significant proportion of the country's poles.

Thailand: A total of 1.55 million ha of planted forest is controlled and managed by the private sector but dominated by SME producers. Demand for eucalypt wood remains strong and the region's eucalypt resource is expanding. There is minimal government involvement.



For smallholder production to thrive, four preconditions need to be met

Byron's "door with many locks" is a framework used to describe the preconditions which are independently necessary for successful smallholder plantings.

- 1. Ownership:** There is a clear and unequivocal ownership of the land and trees.
- 2. Know-how:** A robust technical package of practices which help minimise risks.
- 3. Market:** The certainty of attractive and reliable markets.
- 4. Regulation:** Sympathetic legal and regulatory frameworks and environments.

Only if all conditions are met, will the door open.

Using this framework, the study examines the difference in South Africa, Sub-Saharan Africa and East and Southeast Asia's smallholder forestry development pathways.

We found that South Africa is one of the only locations in Sub-Saharan Africa where smallholder forestry is working sustainably and at scale because of necessary end-markets, economies of scale, and infrastructure. Similarly, in East and Southeast Asia, smallholder forestry has been market-led, bolstered by a large consumer base.

In Sub-Saharan Africa, whilst there are examples of ownership and know-how being in place, it is appropriate market offtake opportunities at viable price points that have most constrained smallholder forestry.



Appropriate market offtake opportunities at viable price points have constrained smallholder forestry.

	 Ownership	 Know-how	 Market	 Regulation
Application of Byron's four keys for East and Southeast Asia region	<p>● ● ●</p> <p>Land ownership strengthened post-independence and often large areas of land allocated by state to communities for out-grower initiatives.</p>	<p>● ● ●</p> <p>Flexible contracts to meet SME producer needs: from inputs, to silvicultural assistance, to loans etc... Depth of knowledge on short-rotation species.</p>	<p>● ● ●</p> <p>Diversified and reliable processing industries for the whole plot / tree, supported by localised offtakers / traders with fair pricing.</p>	<p>● ● ●</p> <p>Vietnam leading the way in reducing transaction costs, other countries catching up and shifting away from 'illegal logging' regulations.</p>
Application of Byron's four keys to South Africa as a country	<p>● ● ●</p> <p>Smallholder remains the owner of the tree, and traditional authorities endorse land use. There is also strong community acceptance.</p>	<p>● ● ●</p> <p>Efficient deployment of extension systems to extensive outgrower networks through group schemes and employee-owned cooperatives.</p>	<p>● ● ●</p> <p>Orchestrated offtake for commodity players (woodchips and pulp / paper). Offtake with first right of refusal for mature tree, and pricing is clear and attractive.</p>	<p>● ● ●</p> <p>Mature and incentivising regulatory frameworks with clear quality / grading standards in place.</p>
Application of Byron's four keys at Sub-Saharan Africa region	<p>● ● ●</p> <p>Lack of secure land tenure/ property rights is often complicated, based on a mixture of partnerships with community land-owners through land-lease or outgrower programmes.</p>	<p>● ● ●</p> <p>Optimal site-specific genetics / species are still being tested. These include pine vs. Eucalyptus, short vs. long rotation. Generally high-cost extension models and high input costs are challenging.</p>	<p>● ● ●</p> <p>Disjointed markets are at times distant from producers. There has been a lack of orchestrated offtake for smallholders with the result that most smallholder crop ends up being sold to informal markets.</p>	<p>● ● ●</p> <p>Periodic log export bans, prohibitive carbon tax regulations, and standards for quality / grading are not in place across several countries.</p>

Based on an illustrative analysis undertaken by CAP, smallholder forestry could be cost competitive if the following caveats are taken into account:

- Land valuation as an opportunity cost of growing forestry vs. other products (e.g. annual crops or tree crops).
- Valuation of labour of SME producer for implementation and maintenance until harvest.
- harvest and logistics costs that can be material in rural areas.

Our research shows a Tanzania based scenario with cumulative cash costs of ~USD 1,000 up to harvest in year 12 (excluding land, time, harvest and logistics costs).

Although complex, if smallholders can be linked to industrial markets, they may offer a more cost-effective supply base.



Sustainable planted forests can support climate mitigation both upstream at the forestry level, and downstream by decarbonizing sectors.



Carbon finance

As stated in the IPCC 6th Assessment Report, limiting global warming to 1.5 degrees will require immediate climate mitigation across all sectors. A large part of this mitigation will be underpinned by carbon removal. Africa has one of the lowest climate finance inflows (3% of global total) and private sector investment remains limited. With rapid urbanization and population growth projected, climate finance can play a crucial role

in realising the regions mitigation potential while supporting sectors that can drive sustainable economic growth.

Commercial forestry is one such sector, with the potential to support climate mitigation, both upstream at the forestry level, and downstream by decarbonizing sectors such as construction, manufacturing and domestic energy.

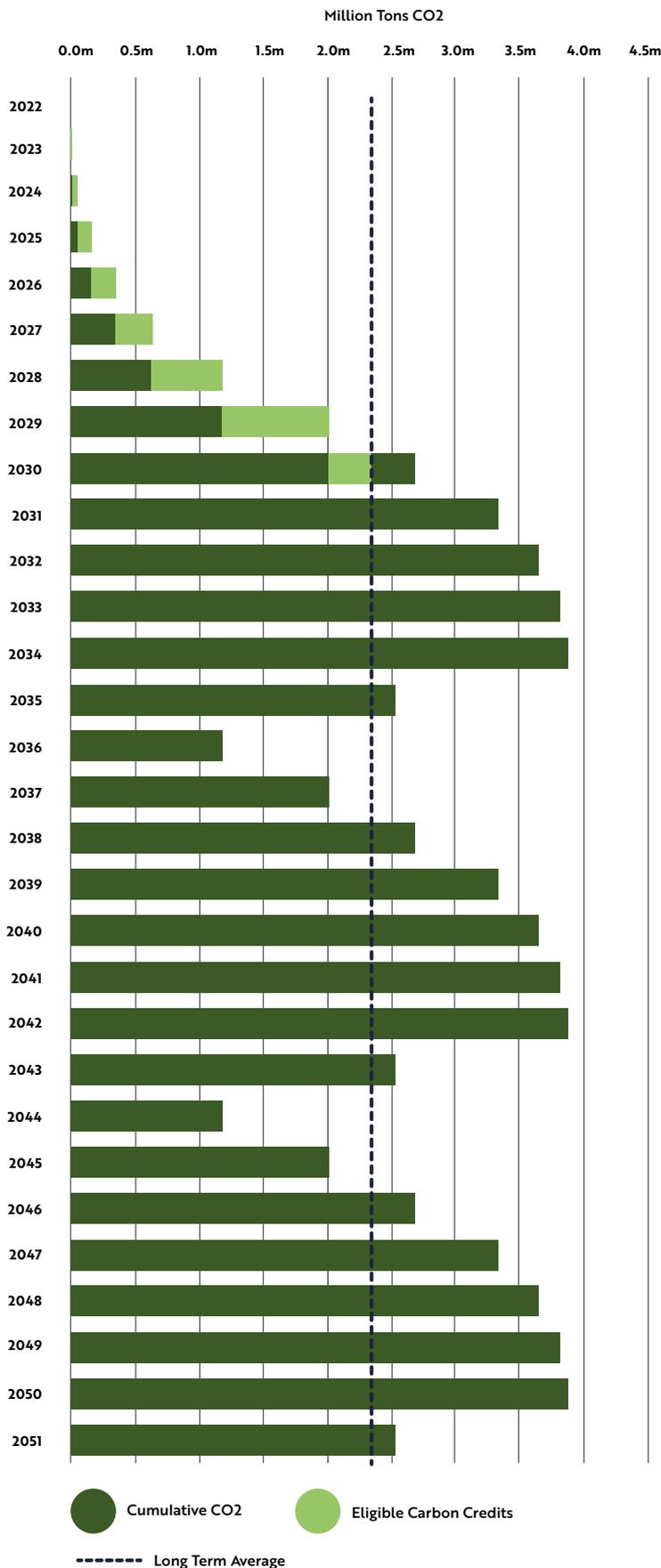
	Upstream Activities		Downstream Activities	
	Forestry	Primary processing	Secondary processing	Processing of by-products using underutilized biomass
Example / Description	Greenfield forestry project that restores degraded land through afforestation, reforestation or revegetation, with trees harvested for timber products through rotational cycles.	Production of primary timber products including sawn timber, poles, plywood and veneer for construction and real estate sector. Some of these products go towards secondary processing on the right	A) Production of mass timber and engineering products that utilize primary products such as plywood and veneer for construction materials B) Other secondary products include doors, windows, other furniture items and industrial products (e.g. crates)	Raw materials that are not used for timber products can be used for a number of alternatives including: (i) steam generation (e.g., CHP); (ii) by products such as pellets, briquettes, charcoal and biochar
Climate impact opportunities	New plantings result in carbon sequestration. Carbon finance can be used to incentivise new projects due to the risk / return profile of investing in the African sector	Production of sustainable construction materials that can substitute for steel / cement and unsustainable timber. FSC certified products ensure sustainability vs materials sourced from natural forests	In-line with primary processing, the usage of FSC certified secondary products ensure mitigation of deforestation and provide a sustainable solution for construction sector	Production and use of sustainable by-products such charcoal and pellets can reduce deforestation. Biochar is an accepted form of carbon removals that also can provide positive impact to the agriculture sector for fertilisers
Carbon methodology status	In place	Gap for primary products	Mass timber and sustainable building materials: Underdevelopment Gap for other secondary products	Biochar: In place; sustainable charcoal: Underdevelopment
Applicability to IPCC sectors to reduce emissions	Carbon sequestration and Ecosystem restoration, Afforestation and reforestation	Efficient buildings and construction materials substitution	Efficient buildings and construction materials substitution	Renewable power generation and bioelectricity

A greenfield forestry project can result in significant carbon sequestration activity if implemented correctly, driving positive climate action. Carbon credits can be generated to incentivise and fund the implementation of projects, thereby improving the risk/return profile. Carbon credits are generated during the 1st rotation only, providing early cash flows for the project.

Based on current methodologies, carbon credit issuance is limited to the long-term average during the crediting period (e.g. 30 years) to account for the fluctuating carbon stock over time due to harvesting and rotation cycles.

Key Findings

Upstream: Illustrative climate impact and carbon credit generation of a 15,000ha sustainable planted forest (subject to changes in methodology)



In the illustrative example, a 15,000 ha greenfield project will generate 2.4m carbon credits, with at least 20% likely to be held in a risk buffer reserve unavailable for monetisation. Assuming a carbon credit price of \$10/t, the above example generates c.\$19m of eligible carbon credit funds that can part-fund project costs and incentivise project development by investors.

Our historical analysis of carbon finance potential showed that at least 20% of total investment costs of greenfield projects in Sub-Saharan Africa could have been funded using carbon credits. If projects were implemented optimally, carbon finance would make a higher contribution based on lower establishment costs and higher yields, resulting in increased carbon sequestration.

For smallholder forestry, carbon finance could play a key funding role, with 1ha generating up to USD 1,000 of carbon revenue before discounting for the risk buffer, returns required by investors for the cost of certification (PDD development, audits), revenue sharing with government and tax. However, smallholder permanence risk could bring challenges in realizing long-term carbon impact, and government carbon taxes could significantly reduce income potential.

Carbon finance also has an opportunity to support market development in downstream industries, which could in turn support upstream forestry investments. For example, carbon savings from building with sustainable timber, such as mass timber, instead of traditional building materials, could reduce carbon emissions by up to 40%. This could be monetised through carbon finance to enhance the cost-competitiveness. Sustainable charcoal production using more efficient kiln technologies could generate carbon credits from avoided emissions. This could have a transformative impact on fuelwood such as charcoal. Not only is African charcoal production a leading cause of deforestation, it is also highly

inefficient, using up to 3x as much wood per ton as is necessary. Emissions are an estimated 360m tco_{2e}, which is 7x10 higher than if modern techniques were used. Sustainable planted forests therefore provide a unique opportunity to leverage new inflows of carbon finance across the full value chain.



20% of total investment costs of greenfield projects in Sub-Saharan Africa could have been funded using carbon credits.

6



**Opportunities
for Action**



To unlock the next phase of growth, industrial processing and securing regional and international offtake markets will be critical.

The last 30 years of commercial forestry investment in Sub-Saharan Africa has been challenging. However, while there have been some losses, some firms are on a path to profitability. New funds are being established by DFIs, and a range of financial and blue-chip companies are increasingly seeking carbon-based investments in the region.

Our research demonstrates that for these to succeed, there needs to be a focus on industrialisation, with more processing investments linked to clear offtake markets, deepening access to higher value international markets using ESG compliance as a

differentiator, and unlocking demand for high quality timber products in place of imports and non-timber substitutes. This would help firms achieve more predictable revenues and in reaching a steady state in terms of positive cashflows and revenue profile.

Investment into industrial planted forests since 1990 have established a brownfield resource base which now provides an opportunity for industrialisation. This should be the priority for commercial investors. If this can be achieved, it has the potential to drive economic transformation across the entire sector.



Industrial scale forestry and processing

For greenfield investors, research highlighted several high-impact areas:

- **Recruiting experienced operators** can ensure effective decision making and execution at all stages of investment helping achieve lower cost sustainable planted forests.
- **Recognising significant patient and concessional finance** will play a crucial role in achieving realistic returns, accounting for the risks posed by the African commercial forestry sector and timeframes needed to reach positive cashflows.
- **Implementing effective community engagement** and investment strategy will play a crucial role securing social licence to operate and mitigate reputational risks for operators and investors.
- **Considering the opportunities for smallholders** to play a meaningful role in the value chain, could give investors an opportunity to potentially reduce costs and further support their social licence to operate.



Smallholder production

To support smallholder expansion, research suggested a focus on the following areas:

- **Accessing diversified whole tree markets** will play a crucial role in the development of smallholder production systems, enabling smallholders to sell the majority, if not all, of the tree. Building on this, processing and product options should be selected considering the needs of smallholders. For example, veneer producers can offer an offtake for short rotation production, while woodchip and sustainable charcoal offer potential value addition for a larger proportion of the tree. These markets can support smallholders by providing increased flexibility in rotation period and silviculture, allowing farmers to decide when to monetise their trees.
- **Developing new service delivery models**, although still underdeveloped within the sector, have the potential to further enable smallholder investments, from extension to offtake aggregation, and technical innovations in smallholder certification and management.



There needs to be a focus on industrialisation, with more processing investments linked to clear offtake markets.



Carbon revenues

And finally, to realise the potential presented by carbon finance and to drive the competitiveness of forestry investments, our research suggested a focus on the following:

- **Supporting access to carbon finance** for sustainable planted forests, recognising the challenging commercial fundamentals for SSA projects and the potential carbon finance has to subsidise an estimated 20% or more of the total greenfield investment costs and fund a majority of smallholder establishment costs, creating an opportunity to improve the investment case for both.
- **Developing new carbon methodologies** could play a crucial role in unlocking downstream market opportunities. If carbon credits can be generated from increased use of timber in green buildings it can bolster price competitiveness relative to traditional materials (e.g. cement, steel); for example, integrating timber into a

Kenyan mid-rise building could offer upwards of 40% lower embodied emissions relative to traditional construction methods. Carbon finance could also play an important role in making sustainable charcoal production economically viable.

- **Developing suitable carbon regulatory environments** will be required for such carbon finance opportunities to be realised, enabling project developers to realise appropriate value for the projects, recognising carbon finance in the forestry context is more of a subsidy rather than a financial windfall.

Gatsby Africa, CAP and Wellspring developed a full research paper documenting all the data collected during the study. To read the full paper, please follow either of the links below:

<https://www.gatsbyafrica.org.uk/insights/>
<https://www.criterionafrika.com/resources/>



wellspring

