African Forestry Investment Conference

MOBILIZING CAPITAL for Forest and Landscape Restoration to mitigate climate change, create large ESG impact and create sustainable development

Mads Asprem
14 June 2017; Accra, Ghana
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KEY POINTS

BACKGROUND
▲ Max 2C climate scenario requires 3-5m ha/year forestation, but the forest cover is still shrinking.
▲ Forestation might have better environmental, social and economic impacts, and the larger effects on poverty alleviation and food security than for any other development activity.
▲ All successful reforestation depend on private smallholder, large planters and good markets.
▲ Entrepreneurial companies, not equity funds, have driven planting and carbon sequestration.
▲ Larger scale ag and forestry are key components of effective, climate mitigating FLR&D.

TRIPPLE BOTTOM LINE WITH INFORMED AND REALISTIC RETURN REQUIREMENTS
▲ Forestry provides climate mitigation effect at lower cost than other activities.
▲ Unique social, environmental and economic impacts for the world’s poorest rural areas.
▲ This study concludes that DFI and impact investors should expect 6-8% (nominal) return on equity and 4-5% interest on debt, excluding benefits from climate mitigation and ESG impacts.

1000 GREAT CONVERSATIONS AND 20 YEARS’ OF FIELD EXPERIENCE
▲ This presentation is based on my experience from leading Africa’s largest forest plantation establishment since 2000, built on landscape models, including the largest FSC certified forest plantations in Africa (ex RSA) and the world’s first voluntary forest carbon project.
▲ Benefiting from 1000+ conversations with dozens of different stakeholders and my current life in academia, it is clear that time has come to push for new, dramatically larger actions.
RECOMMENDATIONS

▲ Establishment of one or more forest and landscape restoration/ greenfield planting funds. The fund should target different types of capital:
   - First loss facility
   - Concessionary equity and debt
   - Development and impact equity
   - Pension funds/ infrastructure and real asset funds
   - Grant providers to support social and infrastructure investments

▲ Long term debt (15-20 years with significant grace periods), similar to what is offered for renewable energy and other infrastructure projects.
   - 5-8 years grace period and sculpted principal repayments
   - Increased component of concessionary debt at 0-1% interest

▲ Equity finance for existing and new companies should be provided by development banks, after years of focusing on high cost, unsustainable debt.

▲ Grants are needed to create better, more effective and larger scale operations, targeting:
   - Climate change mitigation and adaptation grants for private companies.
   - Project design and start-up.
   - Infrastructure, including suitable planting material, robust we-based management systems.

▲ Separate analysis shows that the forestry sector should generate attractive returns, but lack of infrastructure, difficult start-up and long time horizon justify large initial engagement by development banks and impact investors.
SUMMARY
New Actions required to expand forests and restore landscapes in Africa

▲ All major climate change scenarios and several studies (e.g. by Nova Institute, WWF’s Forest for a Living Planet/ NGP and WRI) show the need to significantly expand the global plantation forests.

▲ If global temperature rise is to be kept within 2C, there needs to be a significant increase in the global forest cover and / or carbon capture and storage.

▲ Business as usual is immoral. We have an obligation to act!

▲ Land availability means that Africa has to be part of any meaningful expansion of the world’s forest cover and plantation forest areas. Close to half of the world’s potential to expand the forest cover is in Africa, and Africa has excellent people to do it. Thus, half of the world’s Forest and Landscape Restoration ought to take place in Africa.

▲ Establishing new forests in African creates more positive social, environmental and economic impacts than anywhere else. The landscape model will be the only successful approach to forestation in Africa, combined with the best international standards for sustainable forest management.

▲ Private companies are the locomotives in African forestation:
  - accounting for all large scale forestation, while Government plantations are shrinking
  - developing wood processing facilities producing environmentally friendly, high quality products and benefiting 1000s of small forest owners supplying the new factories

▲ It is the private sector that does ‘proper’ forestry in Africa. Private companies have established and own all African FSC certified plantation forest outside of South Africa.

▲ Only 120,000 ha commercial plantations established since 2000 and slightly more smallholder forests. This is about 2% of the requirement. Planting peaked in 2011 and the current rate of commercial planting is less than 10,000 ha per year. The new commercial planting since 2000 is smaller than the loss of Government forest plantations during the same period.
Plantation projects must be dramatically scaled up to have a meaningful impact. To develop Africa, Africa must benefit from the same scale benefits expected around the world.

A dozen African countries can host large scale Forest and Landscape Restoration projects. A future world-scale biomass to biofuel plantation will require 300,000 ha plantation and the Africa would require and can establish many such plantations to de-carbonise the energy use.

Example of Forest and Landscape Restoration and Development of 300,000 ha
FOREST AND LANDSCAPE ISSUES
All successful large scale plantations in Africa have to follow a landscape model

RURAL DEVELOPMENT AND POVERTY ALLEVIATION

DEVELOP FORESTRY, AGRICULTURE, ENERGY SUPPLIES AND ALTERNATIVE LIVELIHOODS IN THE REGION

- Large scale forest plantations
- Support local SMEs and farmers establishing woodlots
- Agriculture Development Program
- Sustainable firewood and charcoal production / household energy
- Alternative livelihoods programme – Apiculture, Non Timber Forest Products
- Reduce pressure on natural forest
- Conservation and REDD

CARBON FINANCE SHOULD BE AN INTEGRAL REVENUE STREAM
‘It has widely been assumed that increased production of energy from biomass requires a sacrifice in food security, particularly for the world’s poor. Yet closer scrutiny suggests that modern bioenergy — in the form of fuel, electricity or heat — could be developed in ways that actually enhance food security’, according to Lee R. Lynd and Jeremy Woods in *A new hope for Africa* (Nature 23 June 2011).

‘… potentially productive land is rather plentiful in much of Africa whereas lack of development is the most important underlying cause of hunger.’ August Temu of the World Agroforestry Centre observes: “Africa has 12 times the land area of India, similar land quality, and 30% fewer people. And yet India produces enough food to feed itself and Africa does not. The green revolution bypassed Africa primarily owing to serious organizational and institutional weaknesses, not geographically limited capacity.”

‘The impact of bioenergy on food insecurity — and its frequent companions poverty, and underdeveloped rural areas - depends on the crop grown, the land used, the technology employed, and how the bioenergy supply chain is integrated into agricultural, social and economic systems. A range of options need to be considered.’

Poverty is the main driver of food insecurity. Non-farm income is the main driver of poverty eradication in rural areas.
In the future, biomass to liquid fuel (BtL) is likely to be the highest paying end market for biomass if the world will de-carbonise its energy use, according to Daniel Schrag, but current scale is uncompetitive. Bioenergy is traditionally used to produce heat and electricity.

Transport fuel is the second largest source of GHG globally, along with land use/deforestation and after electricity production. Petrol accounts for half of the transport fuel, and is increasingly replaced by electrical cars, ethanol and/or hydrogen fuel cells.

Most of the remaining transport fuel is used as diesel in heavy trucks, trains and ships, or jet fuel, both more difficult to replace by renewable energy. Biomass can play a unique role in the de-carbonisation of these liquid fuels, based on the Fischer-Tropsch (F-T) process.

F-T is a 90 year old well established technology for producing synthetic liquid fuel, including diesel, jet fuel and petrol, from coal (highly polluting) and biomass, via gasification, and increasingly from natural gas. Capital costs for F-T plants are still high and the process is not cost competitive, except when the feedstock is stranded natural gas and the oil price is high.

A ‘world-scale’ 30,000 barrel/day BtL plant requires up to 50,000m3/day biomass, or 10-15m3/year, or twice the volume of a modern one line pulp mill. Establishing the plantation required for this plant will sequestrate 100m tons CO2, or 3% of the world’s annual GHG emission.

Electricity can be produced from a number of renewable sources, some often more cost competitive than bio-electricity. However, biomass can supply valuable baseload power as part of distributed, clean energy solutions, in particular as part of microgrids.

As the required forest plantations (biomass resources) are expanded, electricity production will be the most suitable initial ‘small-scale’ process, until sufficient scale is created to supply large scale bio-refineries, which will take 10-20 years.
FOREST AND LANDSCAPE ISSUES
USD$500m private forestry investments since 2005, of which 40% institutional

▲ Private investors have invested close to US$500m in African (ex RSA) forestry during the last ten years.
▲ Global institutional timberland investments are about USD 120bn. These have played a central role in establishing new forest in South America. Only USD 200m was invested in Africa (40% of private funds).
▲ DFI has played a minor role supporting the forestry sector. They have provided close to US$50m of equity and about $100m of debt to the African forestry companies, but focused on downstream, not plantation.
▲ High interest rate lending ensured that the DFI generated the highest returns. It has been difficult/impossible to attract new private investors to the sector and planting all but stopped following these DFI loans.
▲ Africa has received significant attention at international timberland conferences since 2011. However, no major new private forest investor has invested in Africa since 2008, except Navigator (in Mozambique from 2014) and Erling Lorentzen, the founder/CEO of Aracruz, has established a successful plantation in Ghana.
▲ Global Environmental Fund became the first and so far only dedicated African timberland investment fund by raising US$160m (of which $130m invested) from development banks around 2010, which focused on acquiring established plantations, often orphan assets, primarily in South Africa.
▲ In 2007, Southern Africa (including Mozambique and Tanzania) was included in Global Forest Partners’ (the world’s largest Southern hemisphere forest investors) investment universe, and at the same time, APG, IWC, HMC and Phaunos invested in African forestry, all generating losses from these early investments.

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<td>Existing non-US</td>
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<td>New Zealand</td>
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<td>South America</td>
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<td>Chile</td>
<td>Australia</td>
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<td>Southern Africa</td>
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Source: GFP, 2007
Since 2000, private companies have established 120,000 ha new forests in Africa – a drop in the ocean. In 2017, new planting is expected to fall below 10,000 ha.

This private planting has primarily been done by entrepreneurial companies backed by individual private shareholders, not by investment funds and only to a small extent by institutional shareholders.

The Government sector has been completely absent, except Safcol’s planting in Ifloma, Mozambique, and the net loss of Government forest plantation forest is believed to far exceed what the private sector has planted in Africa.

### African Plantation companies (ex RSA) July 2014

<table>
<thead>
<tr>
<th>Planted areas in ha, excl rubber</th>
<th>Location</th>
<th>HQ</th>
<th>Ownership</th>
<th>Owner loc.</th>
<th>Standing Net plant forest inc 2000</th>
<th>2014/15E</th>
<th>Source: Company Data, Poyry; Some data included 2015 planting</th>
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<tr>
<td>1 Min of Agriculture (MoARD)</td>
<td>Ethiopia</td>
<td></td>
<td>Gov't</td>
<td></td>
<td>162,000</td>
<td>neg.</td>
<td>none</td>
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<td>2 Kenya Forest Service</td>
<td>Kenya</td>
<td></td>
<td>Gov't</td>
<td></td>
<td>110,000</td>
<td>neg.</td>
<td>none</td>
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<td>3 HCEFLCD</td>
<td>Morocco</td>
<td></td>
<td>Gov't</td>
<td></td>
<td>95,000</td>
<td>neg.</td>
<td>none</td>
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<td>4 Gov't plantations (incl. Sao Hill)</td>
<td>Tanzania</td>
<td></td>
<td>Gov't</td>
<td></td>
<td>72,458</td>
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<td>none</td>
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<tr>
<td>5 Comp. de Celulose e Papel de Angola</td>
<td>Angola</td>
<td></td>
<td>Gov't</td>
<td></td>
<td>65,000</td>
<td>neg.</td>
<td>none</td>
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<td>6 ZAFFICO</td>
<td>Zambia</td>
<td></td>
<td>Gov't</td>
<td></td>
<td>54,010</td>
<td>neg.</td>
<td>none</td>
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<td>7 Malawi Forestry department</td>
<td>Malawi</td>
<td></td>
<td>Gov't</td>
<td></td>
<td>53,491</td>
<td>neg.</td>
<td>none</td>
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<td>8 Green Resources</td>
<td>Moz/Tan/Ug</td>
<td></td>
<td>Company Norway/Int</td>
<td>44,000</td>
<td>43,000</td>
<td>5,000</td>
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<td>9 NHR Investments (Montigny)</td>
<td>Swaziland</td>
<td></td>
<td>Company RSA</td>
<td></td>
<td>44,000</td>
<td>neg.</td>
<td>none</td>
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<tr>
<td>10 Caminho de Ferro de Benguela</td>
<td>Angola</td>
<td></td>
<td>Gov't</td>
<td></td>
<td>38,000</td>
<td>neg.</td>
<td>none</td>
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<td>11 Eucalyptus Fibre Congo (MagForestry)</td>
<td>Congo, Rep of</td>
<td></td>
<td>Public sub Canada</td>
<td>30,000</td>
<td>neg.</td>
<td>none</td>
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<td>11 Direction Générale des Forêts</td>
<td>Tunisia</td>
<td></td>
<td>Gov't</td>
<td></td>
<td>29,140</td>
<td>??</td>
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<tr>
<td>12 Rift Valley Corp (Boarders and FdN)</td>
<td>Zim/Moz</td>
<td></td>
<td>Private</td>
<td>UK</td>
<td>28,000</td>
<td>6,000</td>
<td>1,500</td>
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<tr>
<td>13 The New Forest Company</td>
<td>Ug/Rw/Tz</td>
<td></td>
<td>Private</td>
<td>27,800</td>
<td>15,800</td>
<td>1,500</td>
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<td>14 GEF (Shiselweni, KVTC)</td>
<td>Sw/Tz (++ RSA)</td>
<td></td>
<td>Fund</td>
<td>18,000</td>
<td>6,400</td>
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<td>15 Allied Timbers</td>
<td>Zimbabwe</td>
<td></td>
<td>Gov't</td>
<td>Zim</td>
<td>15,000</td>
<td>neg.</td>
<td>none</td>
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<td>16 Wattle Company</td>
<td>Zimbabwe</td>
<td></td>
<td>Private</td>
<td>Zim</td>
<td>15,000</td>
<td>neg.</td>
<td>none</td>
</tr>
<tr>
<td>17 Rai Group</td>
<td>Tz/Ke/Ma/Ug</td>
<td></td>
<td>Private</td>
<td>Kenya</td>
<td>14,000</td>
<td>neg.</td>
<td>500</td>
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<td>18 Safcol (Ifloma)</td>
<td>Mozambique</td>
<td></td>
<td>Gov't</td>
<td>RSD</td>
<td>13,000</td>
<td>some</td>
<td>none</td>
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<td>Global Woods (IWC)</td>
<td>Uganda</td>
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<td>Fund</td>
<td></td>
<td>5,700</td>
<td>5,700</td>
<td>1,000</td>
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<td>Portucel</td>
<td>Mozambique</td>
<td>Lisbon</td>
<td>Public</td>
<td>4,000</td>
<td>4,000</td>
<td>2,700</td>
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<td>Form International</td>
<td>Ghana, Tanz</td>
<td>Netherlands</td>
<td>Private</td>
<td>Neth</td>
<td>3,500</td>
<td>3,500</td>
<td>1,000</td>
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<tr>
<td>APSD</td>
<td>Ghana</td>
<td></td>
<td>Private</td>
<td>Brazil</td>
<td>3,000</td>
<td>3,000</td>
<td>2,000</td>
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<tr>
<td>MIRO Forestry</td>
<td>Ghana</td>
<td></td>
<td>Private</td>
<td>UK</td>
<td>2,500</td>
<td>2,500</td>
<td>1,000</td>
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Tanzania has East Africa’s largest remaining plantation forest in Mufindi, Southern Highlands.

The Government’s largest plantation, Sao Hill Forest Project is currently seeing significant decreases in the annual allowable cut as there was little replanting for two decades until the mid 00’s. Tanzania has had a number of smaller forest plantations, but these have few trees left, and even less ready for harvesting.

There are similar situations in other African countries where Governments still own plantations. Malawi and Zambia had major pine and eucalyptus plantations (the largest 50-60,000 ha each) with little remaining forest. In Uganda, the Government forests are already finished, and the forest is rapidly depleting in other countries.

Source: Indufor
FSC is the world leading standard for sustainable forest management. We believe FSC is a foundation for successful greenfield forest plantation because it:

- Supports creation of high quality forest
- Monitors community relations
- Ensures high environmental standards

The private sector has established and operate all FSC plantations in Africa. More than 90% of this is done by three entrepreneurial companies in East Africa.

In addition to FSC, companies might have two layers of carbon certification that add rigor to the operations and secure compliance with the toughest international standards.

Government forest plantations have no FSC certified areas. Development agencies and donors, which provide significant support for Government forest operations, should demand FSC certification of Government forests, as development banks do from private companies.
▲ Most successful large scale smallholder planting has been market driven: Vietnam, Thailand, India, Tanzania

▲ In East Africa, small sawmillers utilise 1/3 of the raw material. About 40% of the wood has historically been converted to salable products by the larger private companies, compared to 90% in the North.

▲ Increased recovery represent good resource utilization AND increases the value of the forest and stimulates further planting.

▲ The new breed private forestry companies in East Africa established a new electricity pole industry: increasing quality, reducing imports and providing a market for 1,000 of small forest owners.

▲ Industrial scale sawmilling is required to produce clean chips from the wood residuals, which can be delivered to East Africa’s pulp mills.

▲ Sawdust can effectively be converted to wood briquettes in large scale industrial facilities, with the production able to replace fossil fuel or unsustainably managed wood.
New Generation Plantations (NGP) is an industry wide initiative by WWF to promote good and sustainable plantation forestry practices. A dozen companies among the world’s largest plantation owners, and some smaller companies are members.

NGP is based on for key principles (see below) and develops and encourage best international practices for plantation development.

241-304 million ha of new managed (plantation) forests are needed by 2050 to reach ‘Zero Net Deforestation and Forest Degradation’, according to WWF’s Forest For a Living Planet.
FSC is currently working well for the North, but less so for the South based on a number of issues. Most importantly, forest that has been degraded during the last 23 years (since 1994) – i.e. an enormous area globally – cannot be FSC certified.

However, FSC is now set to deal with this issue during 2017:

Current FSC Criterion 6.10: ‘Management Units containing plantations that were established on areas converted from natural forest after 1994 shall not quality for certification, except where … not … responsible … or … conversion affected a very limited portion of the area …’.

At FSC 8th General Assembly in Vancouver October 2017 there is a proposal to updated version of 6.10: Plantation can be established on such land, provided that i) proper and transparent processes to assure that human rights and livelihoods have not been adversely affected, ii) measures taken to mitigate any negative effects and iii) effective and additional restoration of natural ecosystems.
Several Initiatives have been established to promote forestation and landscape restoration and development. Most have in common that they have high targets for establishing new forest, but all are far behind these targets.

These initiatives provide important and valuable frameworks and stakeholder engagement, but have little capacities to execute on the plan.

However, they have generated very little new tree planting or forest restoration.

In order to make progress towards the forestation objectives, these Initiatives must engage with large scale private planters and the small number of successful programs for smallholder and medium planter (eg: SPGS in Uganda and GR’s Tanzanian farm-forest programs).

EXAMPLES OF FORESTATION INITIATIVES

**Bonn Challenge** ([www.bonnchallenge.org](http://www.bonnchallenge.org))

**The Global Partnership for Forest Landscape Restoration** ([www.forestlanscaperestoration.org](http://www.forestlanscaperestoration.org))

**AFR100** ([www.afr100.org](http://www.afr100.org))


**African Model Forest Network** ([http://imfn.net/african-model-forest-network](http://imfn.net/african-model-forest-network))
The Earth is warming and the climate is changing. The global surface temperature has increased by 1.24°C over the last 100 years (base line 1880-1920). Human activity are responsible for the global warming (eg CO2 concentration has jumped from 2-300 to 400+ppm).

The implications are large: glaciers are melting, sea levels are rising, ocean streams and weather patterns are likely to change, deserts are spreading, etc.

It is critical that we step up the mitigation against climate change.

Rapid rise in global surface temperature

Source: NASA

Source: Columbia University (M. Sato), co2.com
Agriculture, forestry and other land uses (AFOLU) is directly responsible for 23% of GHG emission, larger than electricity (ex heat) and industry.

‘On the supply side, emissions from land-use change (LUC), land management and livestock … can be reduced, terrestrial carbon stocks can be increased by sequestration in soils and biomass, and emissions from energy production can be saved through … the substitution of fossil fuels by biomass’ according to IPCC (AR5 p816).

‘On the demand side, GHG emissions could be mitigated by reducing losses and wastes of food, changes in diet and changes in wood consumption, though quantitative estimates of the potential are few and highly uncertain.’

Source: IPCC WG3 AR5 2014 Climate Change Mitigation Intro
Commercial brownfield plantation establishment is probably the lowest cost means of mitigating climate change – and urgently important ($2,000/ha cost, 25m3/yr/ha growth and 10 years rotation)

GHG emission from the AFOLU sector has fallen due to a reduction in the rate of deforestation, but deforestation is still rampant. Overall, 2016 being the 3rd year of unchanged energy sector emission of carbon (at 32Gt), according to IEA.

Still, the current level of emission will soon lead to 3-4C global temperature rise. And, deforestation, and associated peat issues, accounts for 11% of global GHG emission due to continued massive rate of deforestation.

Note: Emission from cattle and other ruminant animals (through enteric fermentation) has continued at a slightly increased level. Issues around manure and fertiliser cause about 4% of the global GHG emissions, with rice cultivation being the 4th AFOLU issues.
Bioenergy meets 10-15% of global energy demand (Lynd and Allee, 2017; and FAO and UNFP 2010: A Decision Support Tool for Sustainable Bioenergy), mainly in developing countries, and accounts for 75% of renewable energy.

Five leading low-carbon (2C) scenarios for 2050 forecast that bioenergy on average need to account for 25% of the primary energy supply (Dale et al., ES&T, 2014) even with an ‘other renewables’ first approach. WWF’s vision for 100% renewable energy by 2050 (ECOFYS/WWF) suggests that biomass will supply 40% of all energy.

Under all these scenarios, 3-5m ha per year of new plantation forests are required to meet the projected demand, far above current rate of global plantation establishment.

Source: Dale et al., ES&T, 2014
CLIMATE CHANGE MITIGATION EFFECTS AND RETURNS
Major climate benefits from 20 years of plantation forestry

- Forest Plantations
- Farm Forest Programme
- Agriculture Development
- Alternative Livelihoods

Carbon stocks
Source: Above and below ground biomass

Sustainable Charcoal Production

Carbon stocks
Source: Above and below ground biomass

Sustainable fuelwood collection

Carbon stocks
Source: Soil

Improved agriculture practices and yields

GHG Emissions
Source: Unsustainable to sustainable production

Natural Forests

GHG Emissions
Source: Reduced Emissions from Deforestation and Degradation

Improved agriculture practises and yields

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Forestry investments supports a uniquely large number of SDGs

▲ 12 of the 17 Sustainable Development Goals are being addressed by private forestry investments (less ambitious, NGP argues plantations forestry supports 10 SDGs). Few or no other sectors address a wider range of SDGs.

▲ In particular, forestry/bioenergy, provides superior SDG impacts compared to other sources of renewable energy.
HIGH IMPACTS AND ESG RETURNS
Unparalleled economic and social benefits for remote rural areas

▲ Forest establishment and maintenance are highly labour intensive. Afforestation takes place in the most remote rural areas and creates employment in areas with typically no or limited alternative employment. This is the main economic and social benefit of forest plantations.

▲ The forest industry has created employment for 10,000s of people. Non-farm income is the main source of economic development in rural Africa. Poverty eradication is proven to be the most effective tool for improving food security.

▲ East Africa’s forestry companies have implemented large community development programs. In Tanzania, the forest companies are responsible for up to 50-75% of the public infrastructure in the villages where it has operated the longest. (See examples right)

▲ The new breed of large private forest companies pay tax and VAT contributing to public revenues, unlike most companies in the sector.

▲ And, have reformed the quality standards in the utility poles and other wood industries.

▲ Africa is a net importer of wood products. The new forests provide high quality domestically products reducing the need for imports.

▲ International companies create unique employment opportunities in business for women.
In East Africa, new forest is established on grassland and degraded forest land (pictures from Tanzania).

All wetlands and valuable habitats (e.g. Miombo woodland) are protected. High Conservation Value areas, wetlands, cultural sites and other valuable areas are identified, conserved and significantly improved.

50-60% of the degraded forest or grassland are typically converted to plantation forestry. When the annual fires are controlled in the remaining 40-50% of the areas, natural forests are re-appearing in valley bottoms and other protected areas. Thus, the mosaic-based forest plantations help to contribute to extensive re-growth of natural forests and thereby increased biodiversity (right picture below).

Almost 90% of East Africa’s population depend on wood-based energy and providing an alternative sustainable source of wood-based energy is a pre-requisite to halt deforestation, which can be done through plantation afforestation.

Forestation can help fight erosion, and the presence of increased root systems limits soil erosion and water leaching. Thus, forests are key to watershed management and water supply.
The key value and return drivers of the business are:

▲ **Cash flow from operations**: generated through the sales of standing timber, stumpage value of logs and sales of processed wood products. As the East African economy develops and customer base broadens, these cash flows should commend increased earnings multiples. **Around the world, only 1/3 to ½ of total forest investment returns have come from the cash yield**, with the rest coming from the other three value drivers.

▲ **Biological growth**: represented by biological asset value, which is the DCF value of the standing forest (average remaining 8-9 years life), excluding replanting and with zero end value. Historically used 11% discount rate in EA (8%+ premium over European and US forest cash yields), which seems high.

▲ **Project and land value appreciation**: recognised through a SOTP valuation and/or DCF end values. GR books land at cost. Experience from around the world, not the least in Uruguay (the most recent country with large plantings), suggests that as the forest industry develops, the land value increases.

▲ **Discount rate compression**: historically important source of return as timberland returns have approached bond returns and frontier markets have become emerging markets. Moving to a second rotation also reduces risk and discount rate (on the basis of proven yields), as does the multiple market options in East Africa compared with “single” export market exposure in some timber countries.
The Global Impact Investment Network (GIIN) has been developed a number of impact investing indices, managed by Cambridge Associates, initially for private equity/venture capital funds in 2015 and in May 2017 it published a new set of Real Asset Impact Investment indices, including Timber, Real Estate and Infrastructure (mostly renewable energy).

The Timberland Impact Investing Benchmark (almost entirely US) has generated 5.9% pa return from 1997-2014, significantly higher than the 3.3% pa for the non-impact ‘Comparative Universe’. This is the only real asset class (others being real estate and infrastructure) where the impact funds generate higher return than the benchmark/comparative universe.

The NCREIF Timberland Property Index, the US industry benchmark, has generated about 7.5% pa return over the same period (1997-2016, of which 3.6% was cash return), or more than twice of the benchmark presented by CA/GIIN. The lower returns of the CA/GIIN index might be surprising, but is probably correct, as the return of the ‘industry-managed’ NCREIF index has long looked on the high side.

The capitalisation of the CA timberland impact benchmark is $3.9m, while the benchmark/comparable universe has a capitalisation of $6.5m. On the other hand, at the end of 2016, the NCREIF Timberland Index consisted of 446 investment-grade timber properties with a market value of $23.6 billion. The NCREIF Timberland Fund and Separate Account Index (NTFSAI) has $19bn in market cap.

In the world’s largest timberland market, the USA, forest investments generate 3% pa cash return, and total return of 3-7% pa – with little no/outlook for growth.
The US Timber-Real Estate Investment Trusts (T-REITs) are yielding 3.7% (almost 1.5x private timberlands), but expected yield is probably lower as the dividend is not covered by earning or underlying cash flow. REITs are tax efficient vehicles and 90% of the cash flow has to be paid out in the form of dividend. The US T-REITs trade on 37x EPS and EV/EBIT of 23.

Private US timberland transactions takes place at higher valuations than the trading multiples of the T-REITs, partly because of control premium and higher level of transparency at private transactions.

Importantly, two years ago it was discovered that the cash generation and dividend of the T-REITS exceeded the long term sustainable rate. Thus, there may be future dividend cuts among the T-REITs.

Two of the three US T-REITs have relative modest investments outside of the US, in New Zealand and Uruguay. With increased pressure on dividend, they might look for future dividend support outside of the US.

Among the telecom infrastructure REITs, American Tower Corporation (AMT) has invested in partly and fully owned businesses in Africa, including South Africa, Ghana, Nigeria and Uganda. The dividend yield of this growth REIT with African exposure is 2%. AMT is one of four pan-African telecom tower companies, along with IHS Towers (mkt leader), Helios Towers Africa and Eaton Towers.

### Timberland REIT Valuations

<table>
<thead>
<tr>
<th>26/6/17</th>
<th>Exchange</th>
<th>Ticker</th>
<th>$/share</th>
<th>m Shares</th>
<th>Mkt cap</th>
<th>Net debt</th>
<th>EV</th>
<th>EBIT</th>
<th>EV/EBIT</th>
<th>EPS</th>
<th>p/e</th>
<th>Div.</th>
<th>Yield</th>
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</thead>
<tbody>
<tr>
<td>Potlatch Corp</td>
<td>NASDAQ</td>
<td>PCH</td>
<td>48.25</td>
<td>40.6</td>
<td>1,959</td>
<td>461</td>
<td>2,419</td>
<td>127</td>
<td>19</td>
<td>2.04</td>
<td>23.7</td>
<td>1.50</td>
<td>3.1%</td>
</tr>
<tr>
<td>Rayonier Inc</td>
<td>NYSE</td>
<td>RYN</td>
<td>29.31</td>
<td>128.8</td>
<td>3,775</td>
<td>911</td>
<td>4,686</td>
<td>128</td>
<td>37</td>
<td>0.40</td>
<td>73.1</td>
<td>1.00</td>
<td>3.4%</td>
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<tr>
<td>Weyerhaeuser Company</td>
<td>NYSE</td>
<td>WY</td>
<td>33.63</td>
<td>751.9</td>
<td>25,286</td>
<td>6,093</td>
<td>31,379</td>
<td>1445</td>
<td>22</td>
<td>1.04</td>
<td>32.3</td>
<td>1.26</td>
<td>3.7%</td>
</tr>
<tr>
<td><strong>Sector Weighted Average</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>31,020</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>23</strong></td>
<td></td>
<td><strong>37</strong></td>
<td></td>
<td><strong>3.7%</strong></td>
</tr>
<tr>
<td>American Tower Corporation</td>
<td>NYSE</td>
<td>AMT</td>
<td>132.46</td>
<td>425</td>
<td>56,296</td>
<td>18,359</td>
<td>74,655</td>
<td>2301</td>
<td>32</td>
<td>3.04</td>
<td>43.5</td>
<td>2.51</td>
<td>1.9%</td>
</tr>
</tbody>
</table>
FINANCIAL RETURNS
Land value appreciation is part of all real asset returns – Is Africa different?

△ … It is not – if you care about African development
△ There are six main Southern hemisphere forest plantation countries: Australia, Brazil, Chile, New Zealand, South Africa and Uruguay
△ Since the 00s, major new planting is only taking place in Brazil and Uruguay and Uruguay is the most recent country to develop a large scale forestry industry
△ Since 2004, land prices in Uruguay have increased 8x due to rising demand and limited supply
△ The timber industry in East Africa resembles that of Uruguay in the early 2000’s: Strong productivity/biological growth combines with low cost of land
△ Mozambique and Tanzania each have the potential to establish a larger forested area than Uruguay
△ Africa has 37% of the world’s available arable land, followed by Latin America with 35% and Asia/Oceania by 11%, with Mozambique and Tanzania repeatedly identified by consultants as the most attractive countries to establish forest plantations.
△ Argentina, Columbia, Mozambique and Tanzania (and Paraguay and Ghana) may be only countries in the world with suitable locations for a new world scale wood processing facility
△ If East African forests sells at 7.5% pa cash return and no terminal value, investors should expect total return of at least 15%. EA companies have not been able to capitalise on non-cash value accretion to date.

Uruguayan land prices (unplanted)

Land prices generating additional returns in Uruguay

Source: Uruguay Ministry of Agriculture

Uruguayan land prices have increased 8x since 2003
East Africa’s timber industry resembles that of Uruguay in the early 2000’s
FINANCIAL RETURNS
Development bank’s equity and debt returns around 5-7%

▲ CDC’s UKP return on investments during the last 5 years have been 6.9% pa, and has a new strategy since 2012, concentrating its investment to Africa and South Asia, while re-starting direct equity investments. Equity return target said to be low double digit figures.

▲ DEG has a large agricultural portfolio, and we believe the historic returns are close to zero, but positive.

▲ FMO has implemented a new strategy from 2013 (illustrated below), with an objective of doubling the impact and halving the carbon footprint. FMO has a historic 5-year ROE of 7.2% and a target of 6%.

▲ Norfund has generated 5% return on its total portfolio during the last 20 years. It has a large clean energy portfolio (half of total asset of NOK 12.8bn or about $1.5bn) with similar real asset characteristics as forestry, but are typically backed by I-t take-off contracts. The Clean Energy portfolio (95% equity) has generated 4.9% pa return from 2007-16. Food and agribusiness has generated minus 6.3% pa return since 2006.

▲ Assuming equity returns more than debt, we estimate a historic debt return of 4-5% and equity return of 6-8%. Forestry is an infrastructure asset, with real asset characteristics, and should therefore expect to generate lower than average return.

![Image of strategy diagram](image-url)
**FINANCIAL RETURNS**

**African Private Equity has provided 6-7% pa return**

▲ Snake oil sales men claim Africa PE funds have a hurdle rate of 20-30% for their equity investments, which would make it impossible to make long term timberland investments, but these claims lack foundations.

▲ The 10 year IRR for African PE and VC was 7.2% to 2015, according to Cambridge Associates. During the last five and three years, the return was 5.9%.

▲ Based on Bloomberg and Prequin key African PE funds have 3-14% pa return, which suggest that the average African PE return for the last ten years has been well below 10%:

- Ethos Private Equity Fund ($866 in 2006): 3.0% IRR
- Helios Investors II LP ($908m in 2010): 7.8% IRR
- Development Partners International, ADP I (2008): 13% IRR

▲ The 10-year IRR of ‘a representative basket’ of South African private equity was 17.7% through 3Q 2016, according to the RisCura-SAVCA Performance Report, compared to 16.5% for the JSE Financial and Industrial share index (SAVCA is the Southern African Venture Capital & Private Equity Association).

- The returns have fallen significantly as the market has matured and interest rates have stopped falling, with the five year return at 14.5% and 3-years at 13.7%.
- From 2007 to 2016 (avg rates) the ZAR/USD fell 55%, leading to 8.7% pa in USD for the last 10 years, but for the last 5 years, there is a LOSS of 3.3% pa and a 3-years loss of 5.4% pa. Recently, public equities have performed much better.
- However, such industry generated statistics typically exaggerate the returns, not providing proper weighting for failed/ disappeared fund managers and keeping poorly performing assets at book value.

▲ Based on this, DFIs and impact investors should expect 6-8% pa equity return on their agriculture and forestry investments in Africa
Forestry is a long term investment, and establishing a sustainable forestry industry in Africa has been more difficult than expected, while impact and financial returns looks attractive. Thus, development banks and impact investors need to provide equity in order to sustain and grow the forestry sector in Africa.

To accelerate much needed forestation, it is recommended that one or more forest landscape restoration and greenfield planting funds are being established. These funds should target different types of capital:

- First loss facility
- Concessionary equity and debt
- Development and impact equity
- Pension funds/ infrastructure and real asset funds
- Grant providers to support social and infrastructure investments.

There is infrastructure established by existing companies and Governments, opening up for significant brownfield investments at reduced costs and improved quality compared to the initial private forestry investments.

Besides normal investment management, a Greenfield Forest Fund must be operational focused to avoid repetition of all the mistakes made in African commercial forestry over the last 20 years and spear-head the development in order to close the gap to the leading Brazilian forestry industry.
MODELS FOR FINANCING
Long-term Loans – Combination of Commercial and Concessional Debt

▲ Greenfield plantation project must be grant and equity funded during the initial years, but long term debt will play a key role in the overall financing.

▲ Debt should be provided for 15-20 years with 5 years+ grace for principal repayment, as is often typical for other real assets: infrastructure and renewable energy projects. These types of loans might also be provided for the oil and gas and mining sectors.

▲ AfDB’s $24m Form Ghana loan, for establishing and maintaining teak plantation, is the right type of financing.
  - 15 years maturity
  - 7 years grace period
  - Sculpted principal repayment

▲ We are guessing that the commercial part of the loan is priced at 500bp above LIBOR, while the concessional FIP is at 1% fixed over 15 years, or 150bp below LIBOR. This gives a blended rate of 229bp above LIBOR.
MODELS FOR FINANCING

Carbon finance has been a disappointment, but can still play a role

▲ The world cannot stop supporting the most cost effective climate change mitigation activities. It is more urgent than ever. Thus, international ‘carbon trading’ ought to accelerate.

▲ Carbon finance can make a larger contribution and provide more additionality, to forestation, than to other form of carbon mitigation activities.

▲ The cost of mitigating climate change per CO2e is lower for forestation projects than for any other major carbon projects.

▲ No climate change mitigation activity creates larger economic and social benefits for the rural poor than afforestation.

▲ However, carbon trading mechanisms and tCER and VER prices and volumes have not developed as hoped for. Carbon finance has been complicated and expensive. The methodologies can be further simplified and streamlined.

▲ The result is partly that the carbon industry’s focus has benefiting cities and office workers, and had a very moderate effect on the climate.

▲ REDD+ projects outside of rainforest areas must include afforestation components in order to ensure alternative supply of wood to the people previously dependent on firewood and charcoal produced from the protected forest. REDD without afforestation will drive up energy prices and hurt the poor.
Climate Change finance has so far almost entirely meant Carbon Finance. However, Carbon Finance has proven to be far less efficient than predecessor environmental trading mechanisms, for example for sulphur dioxide, and it has not been successful at preventing continued large greenhouse gas emissions.

- Direct funding of carbon projects is likely to become increasingly popular. For example, the new Green Climate Fund (GCF) is much larger that the old Climate Investment Funds.
- In parallel with Mitigation finance, large about of funding has been set aside for Climate Change Adaptation (CCA), with GCF setting aside 50% of the funding for adaptation.

Impact Investors aim to create results that are similar to the objectives of climate change adaptation, and organisation like the Global Impact Investment Network has developed IRIS and other standards to measure investment and project impact.

AfDB has proposed an innovative way to support adaptation: Adaptation Benefit Mechanism (ADM) were it is proposed that there will be a payment for ‘Adaption Benefit Units (ABU).

- ‘An ABU is an output or outcome of an activity which makes households, communities or economies economically stronger and there more able to withstand climate-induced shocks (hard and soft’ concrete and human’).
- ABM is a results based payment mechanism that aim to use the CDM infrastructure.
- An ABU might be the creation of m3 biomass, 1 ton sustainably produced charcoal, 1 ha reforestation (meeting x standards), restoration of 1ha natural forest (meeting x standards).

Forestry projects would be highly interesting and effective CCA project.
Omidyar Network’s presented the Returns Continuum Framework in SSIR Winter 2017. This is an elegant way to illustrate how a mixture and grant and sub-commercial finance can create the basis for a sustainable business generating long-term commercial returns. There are several similar concepts illustrating the mix of social and financial values.

To kick-start and create sustainable planting in Africa, initial grant funding is required. Omidyar Network’s Return Continuum Framework is useful to illustrate how grants (C2) combined with debt and equity (A2) funding can create a sustainable (A1) African forestry industry.

Examples of grant funded investments would be stakeholder engagement, project design and certification, sustainable management systems and tree-breeding.

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**The Returns Continuum Framework**

For all of its investments, Omidyar Network has the same high expectation for direct (firm-level) impact. But expected market impact and expected financial return vary by type of investment.

<table>
<thead>
<tr>
<th>Commercial</th>
<th>Subcommercial</th>
<th>Grant</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>B1</td>
<td>C1</td>
</tr>
<tr>
<td>Market-val</td>
<td>Positive</td>
<td>80%-100%</td>
</tr>
<tr>
<td>validated</td>
<td>absolute</td>
<td>cost</td>
</tr>
<tr>
<td>A2</td>
<td>B2</td>
<td>C2</td>
</tr>
<tr>
<td>Not market-validated</td>
<td>Capital</td>
<td>20%-80%</td>
</tr>
<tr>
<td></td>
<td>preservation</td>
<td>cost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0%-20% cost coverage</td>
</tr>
</tbody>
</table>
MODELS FOR FINANCING
Grants must substitute for the tax incentives that have driven forestation in ROW

▲ Tax incentives, concurrent (not future) direct or indirect, have played a key role in providing cash support for establishing new forest plantations around the world, including every major Southern hemisphere forestry country.

▲ Tax incentives have not and cannot play a role in establishing new plantations in sub-Saharan Africa.

▲ Small cash grants (through the EU and Norwegian funded SPGS) have worked well to establish vibrant medium sized forest plantation sector in Uganda, and other smaller initiatives have followed.

▲ Donors should recognise the successful role of private farmers and companies in establishing new forests and landscape restoration.

▲ To facilitate forestation in Africa, create a level playing field with the forestry industry in the rest of the world and between the private actors and the Government sector in Africa, significant additional grant support should be provided for forestry in Africa for:
  - Cash grants for successful planting
  - Building industry infrastructure

Main plantation countries in the ‘00s – all benefiting from major direct or indirect Gov’t subsidies

Source: ABRAF, ABARE, INFOR
Lee R Lynd et al. published ‘Bioenergy and African transformation’ in 2015 and concluded:

- ‘Africa has the highest incidence of food insecurity and poverty and the highest rate of population growth. Yet Africa also has the most arable land, the lowest crop yields and by far the most plentiful land resources relative to energy demand.’

- ‘In Brazil [the large agricultural exporter], social development, agricultural development and food security, and bioenergy development have been synergetic rather than antagonistic.’

- ‘If done thoughtfully, there is considerable evidence that food security and economic development in Africa can be addressed more effectively with modern bioenergy than without it.’

Globally, 58% of the cropland (<1bn ha) produce 86% of the food and feed (West et al.; Science 2014). Globally, 3.4bn ha of pasture land is providing 1% of the world’s dietary calories (Wood et al., 2015; Herrero et al., 2016)

Source: Alexandratos, N., J. Bruinsma, FAO, 2012
Recent developments of t-REITs

▲ Timber real estate investment trusts (t-REITs) are publicly traded companies where 90% or more of the cash generation is paid out as dividend to and taxed by the shareholders.

▲ In November 2015, Weyerhaeuser announced an agreed all stock acquisition of Plum Creek for $8.44bn, and the combined company will almost account for 90% of the value of the timber-REITs. Plum Creek jumped 20% following the announcement of the acquisition.

▲ The US timber-REITs had underperformed S&P500 for almost three years, following an initial strong performance after the financial crises. A key driver of the underperformance is that their dividend has not been fully supported by the cash flow.

▲ The underperformance was made worse in 2015, as it has been revealed that some t-REITs have boosted cash flow by harvesting above the long term sustainable level and that they have been acquiring short term (5-10 years) harvesting licences of mature forest, rather than buying the underlying timberlands.

▲ Rather than conserving values, reduce harvesting and leave the forest to grow (which is an important attraction of timberland investments) when US log prices fell after 2008, the T-REITs increased the harvesting to support their cash generation and ability to pay dividend.

▲ On the other hand, American Tower Corporation (AMT), the leading infrastructure REIT, has performed in line with S&P 500. AMT has generated dividend growth, partly by investing in emerging markets, including Africa.
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Asprem Analytics Ltd, 31-33 New Street, St. Helier, Jersey, JE2 3RA, United Kingdom