



**FORESTRY SOUTH AFRICA**

# **FORESTRY EXPLAINED**

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**A FASCINATING INSIGHT INTO FORESTRY  
IN SOUTH AFRICA**

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# INTRODUCTION

Forestry is more than simply the science of planting, managing and caring for timber plantations. It's about the landscape that our timber plantations are a part of, the animal and plant species that call the forestry-owned land home and the people and communities that the industry touches.

It's about developing best practices that are efficient and effective with the lowest environmental and social impact possible, while producing an array of sustainable and versatile end-products.

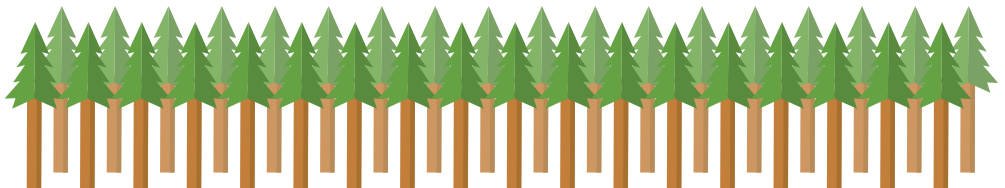
The forestry industry's legacy in South Africa is far reaching and we, as Forestry South Africa, are proud to be part of it.

## ABOUT THIS BOOKLET

In this booklet, we have included a selection of infographics from [www.forestryexplained.co.za](http://www.forestryexplained.co.za).

This one-stop resource offers in-depth but easy-to-read content supported by well-illustrated infographics and additional links for those who want to explore the industry further. It is ideal for learners and teachers.

We encourage you to visit the website as it offers itself as 'a beginner's guide to forestry in South Africa' and caters for users of all ages. It covers the basics of forestry and forest products, and everything from water-use to recreation, pest control, ownership and end-uses.



# CONTENTS

Reasons to choose wood.....2

## Getting to know us

Getting to know South African forests.....4

Timber plantations.....6

- Getting to know the trees.....6



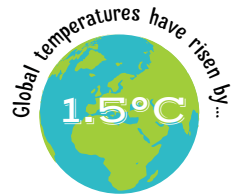
## Sustainability

Forestry and climate change.....8

- Sustainable timber plantation management.....9

- How forests can help climate change.....10

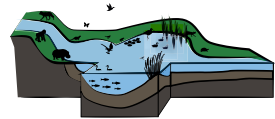
Green deserts.....11



## Water

Water use in forestry.....12

Why water is regulated in forestry.....13



## Tree health

Threats to timber plantation health.....14

Timber plantation diseases.....15



## End products

Value of a sawlog tree.....16

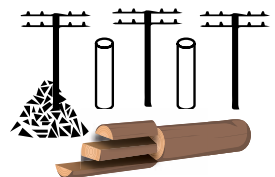
Value of a pulp log.....17

End products.....18

From saw to sawdust.....20

From forest to pulp.....22

Careers in forestry.....24



# REASONS TO CHOOSE WOOD



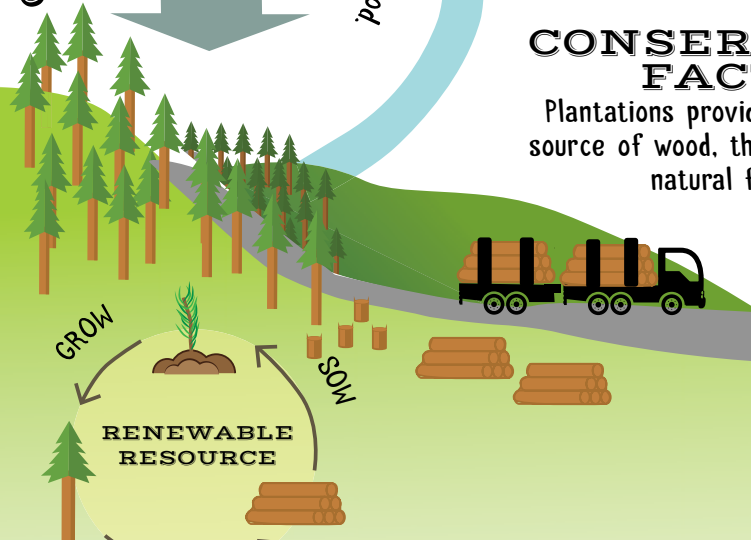
**1.47KG** of carbon removed from the atmosphere. **+** **1KG** of **OXYGEN RELEASED**

**0.9 TONNES** of carbon for every **1m<sup>3</sup>** of wood  
**CARBON SINK**

Trees are the **PLANET'S LUNGS!**

## CONSERVATION FACTOR

Plantations provide an alternative source of wood, thereby conserving natural forests.



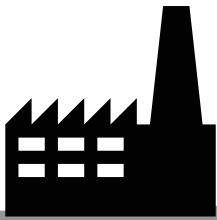
Global bodies like the Forest Stewardship Council® **FSC®** are ensuring forestry is being managed **SUSTAINABLY.**

Over 80% of SA plantations are FSC® certified.

The forest industry supports well over **1/2 a million** South Africans.

# CARBON NEUTRAL FUEL SUBSTITUTE

Wood only releases **CO<sub>2</sub>** it had previously removed from the atmosphere.



To other energy intensive building materials like concrete, steel and aluminium. These require large amounts of energy and fossil fuels in their production process.

Wood has **BEST THERMAL INSULATION VALUE** of all building material.

Wood is a **HUMIDITY REGULATOR**. It absorbs moisture in WET conditions and releases moisture in DRY conditions.



The **CARBON STORED** in trees **OFFSETS** the amount released during:

Harvesting



Processing



Manufacturing



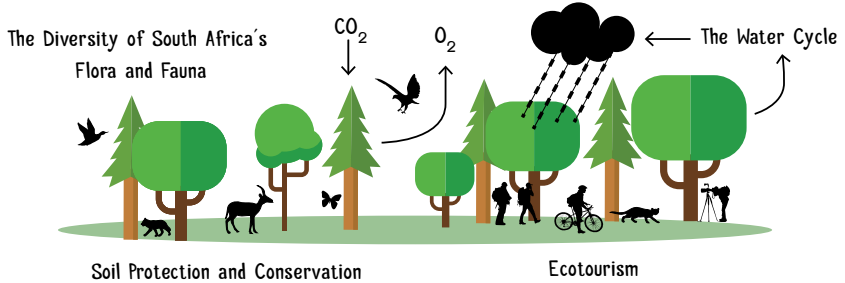
Transporting



**200** HOMES  $\equiv$  **100** TONNES CARBON

# GETTING TO KNOW SOUTH AFRICA'S FORESTS

**FORESTS** have a **CRUCIAL** role to play in:



Globally, there are over **800** definitions of a forest!

In South Africa, a forest is considered to be:

An area of land **DOMINATED** by **TREE SPECIES** with **OVERLAPPING CANOPIES**, covering at least **75%** of the area and very **LITTLE** grass or herbaceous **GROUND COVER**.



Although, South Africa by nature is not a forest rich country, it does have some natural (or indigenous) forests, as well as timber plantations.

## NATURAL FORESTS

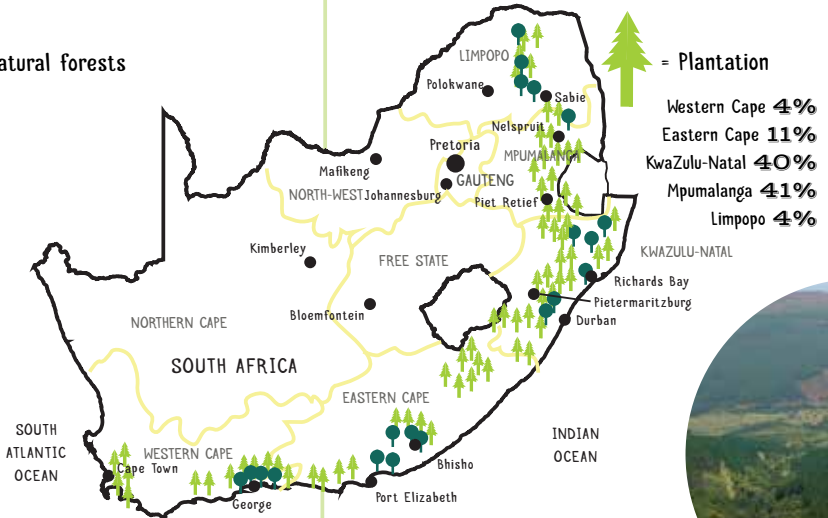
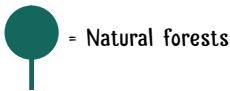
## TIMBER PLANTATIONS

Areas of naturally growing indigenous tree species.

Established through afforestation. (planted on what were previously non-forest ecosystems). They comprise almost exclusively non-indigenous. (exotic), commercially profitable tree species.

**0.5 MILLION** hectares.  
**0.4%** of South Africa's land cover.

**1.2 MILLION** hectares.  
**1%** of South Africa's land cover.



South Africa's natural forests are home to some **649** woody and **636** herbaceous natural plant species.

South Africa grows **3** major genera: Pine, Eucalyptus and Wattle.

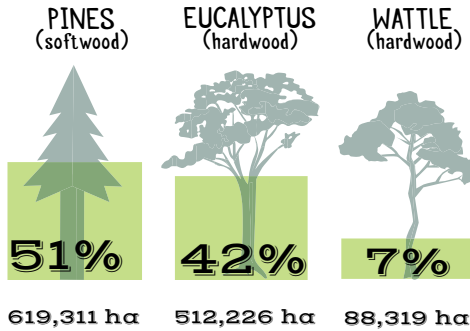
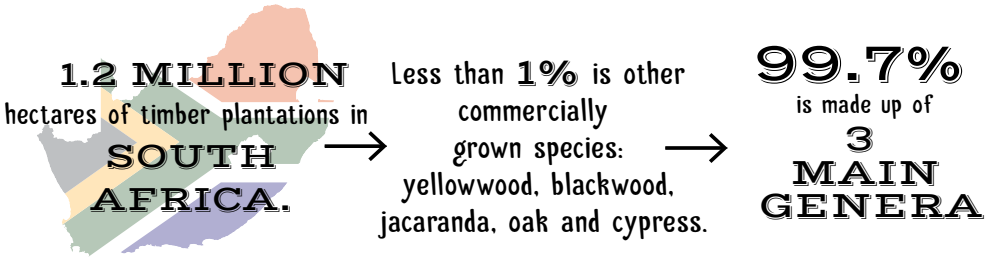


Some are completely unique to South Africa.

The other **1%** is made up from a mix of other commercially grown indigenous species.

Around **25%** of South Africa's natural forests are conserved within timber plantations.

# TIMBER PLANTATIONS GETTING TO KNOW THE TREES



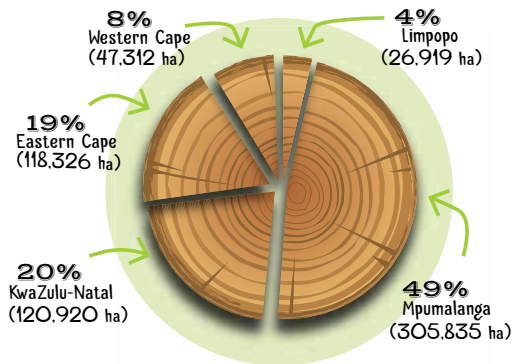
## PINE

### 3 MAIN SPECIES



Plus various other species and hybrids selected and specifically bred to combat tree threats and improve production.

### WHERE ARE THE PLANTATIONS?



### END PRODUCTS





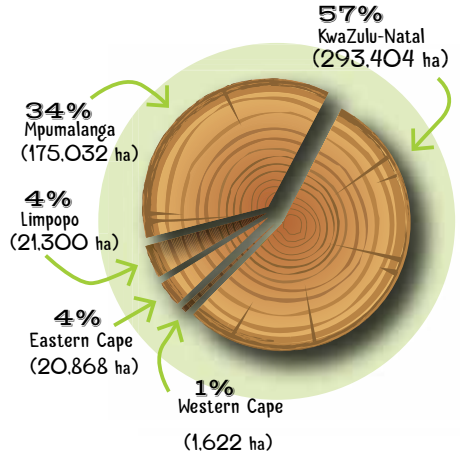
# EUCALYPTUS

## 5 MAIN SPECIES

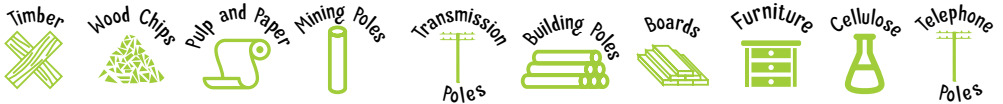


Plus various other species and hybrids selected and specifically bred to combat tree threats and improve production.

### WHERE ARE THE PLANTATIONS?



## END PRODUCTS

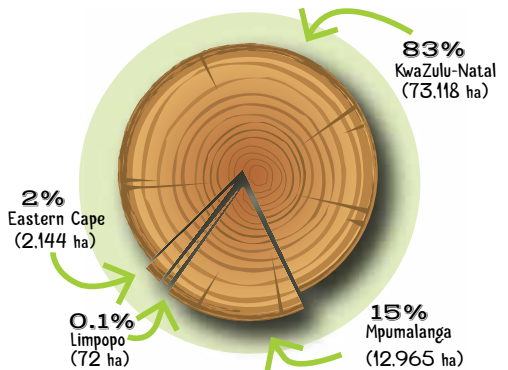


# WATTLE

## 1 MAIN SPECIES



### WHERE ARE THE PLANTATIONS?



## END PRODUCTS



# FORESTRY AND CLIMATE CHANGE

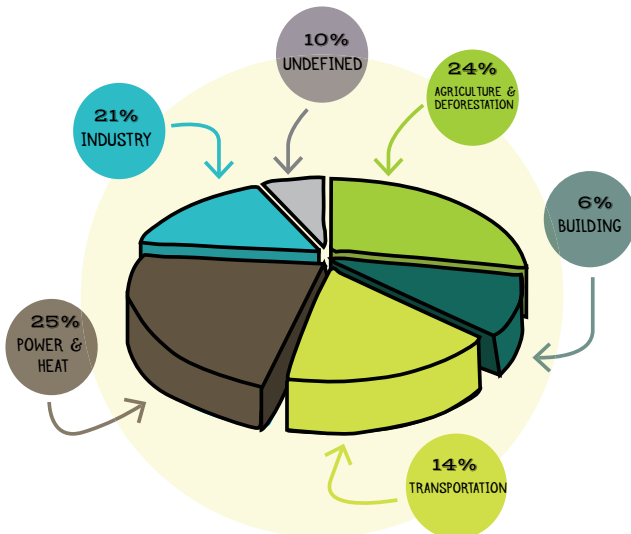
## DEFORESTATION VS SUSTAINABLE TIMBER PLANTATION MANAGEMENT

While both involve cutting down trees, when it comes to climate change they couldn't be more different.

### DEFORESTATION

Is the transformation of a forest into cleared land, when trees are cleared but not replanted. Deforestation is one of the biggest contributors to greenhouse gasses adding **1.6 gigatonnes of CO<sub>2</sub>** every year, making it a major driver of climate change.

Gigatonne = 1 billion tonnes



### What is CARBON NEUTRAL ?

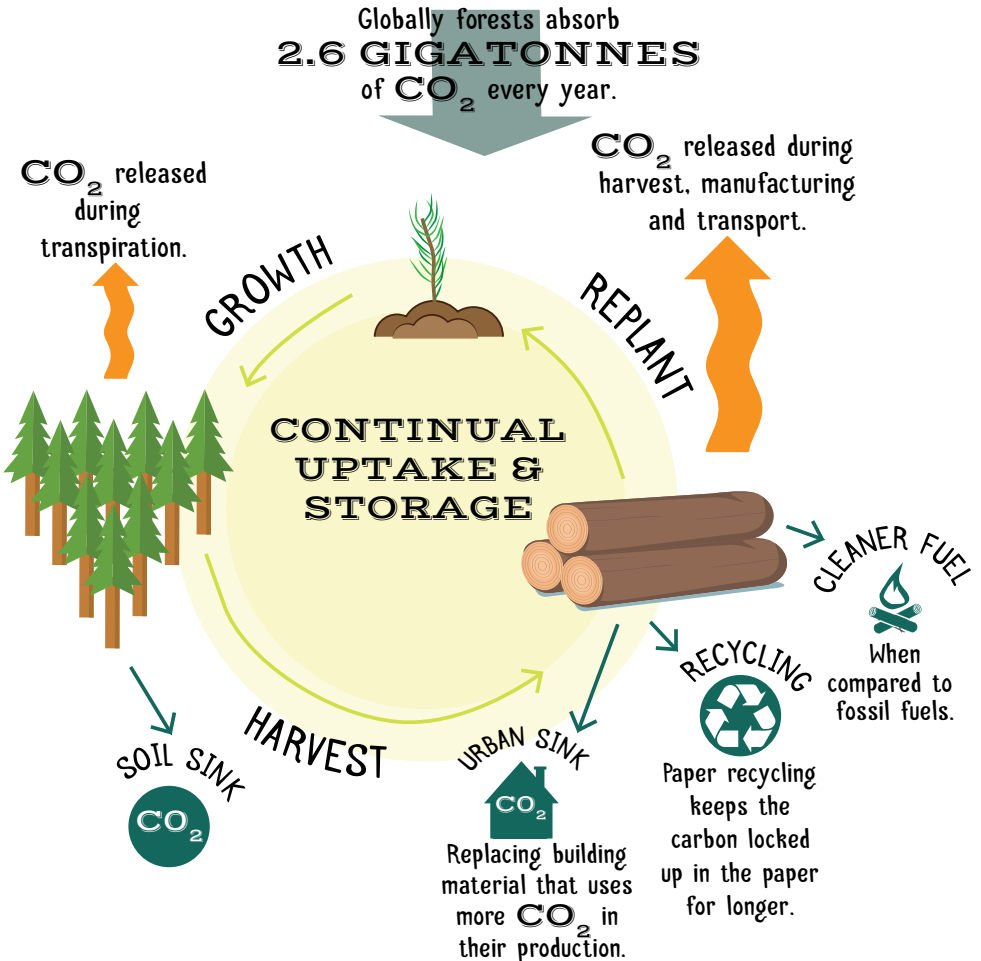


It is when the carbon released is equal or less than the carbon taken up.



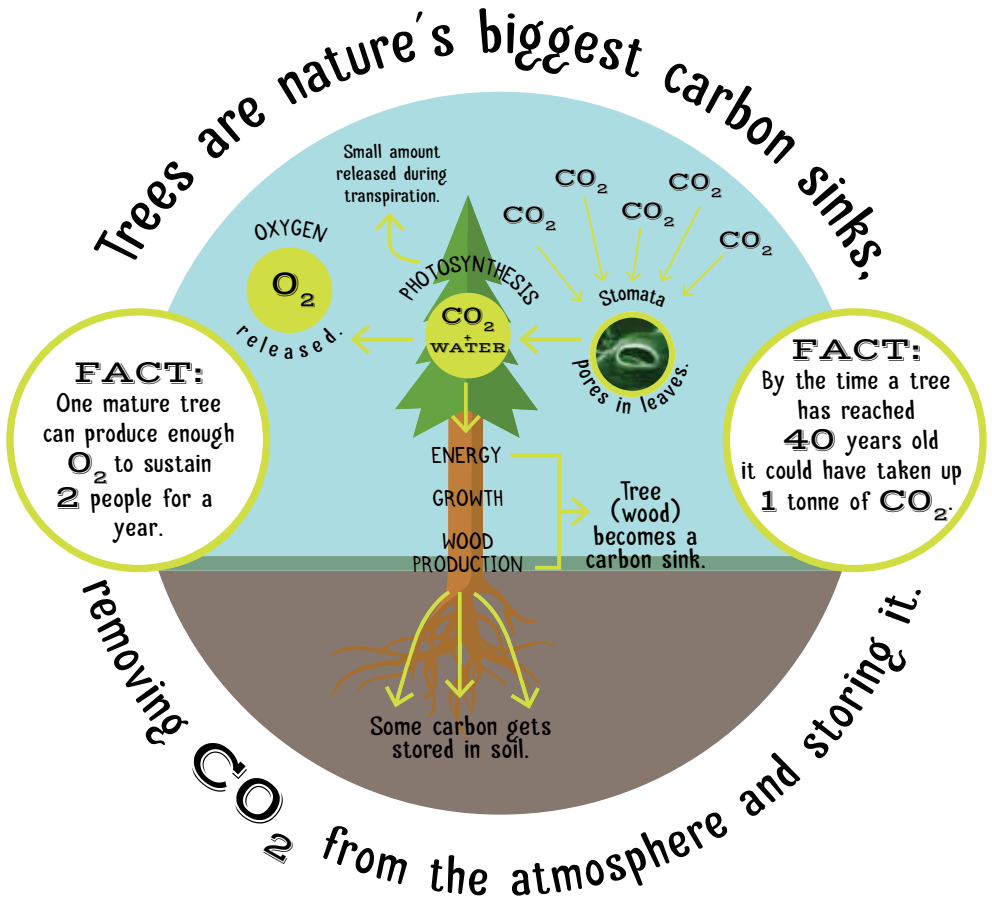
# SUSTAINABLE TIMBER PLANTATION MANAGEMENT

Sustainable timber plantation management ensures that rate of harvesting (felling) and planting are synchronised such that the area under timber remains the same.



Sustainable harvesting can help fight climate change by absorbing  $\text{CO}_2$  from the atmosphere and storing it in a variety of carbon sinks. It also provides a renewable, carbon neutral alternative to fossil fuels.

# HOW FORESTS CAN HELP CLIMATE CHANGE



Trees, forests and timber plantations all have an important role in influencing climate change.

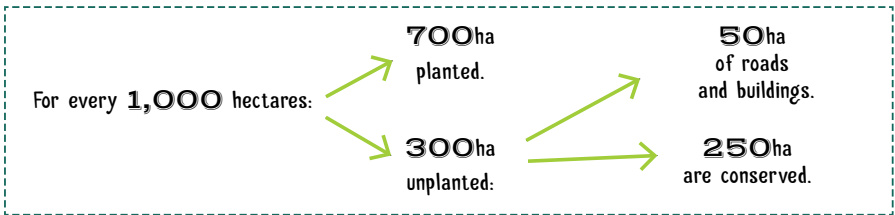
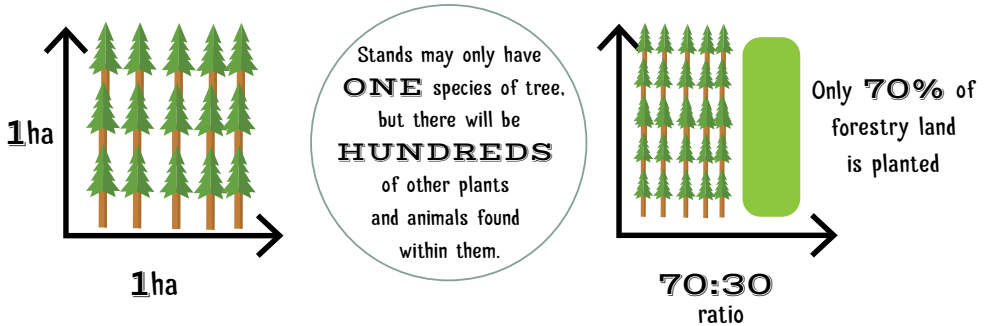
# GREEN DESERTS?

The irony of this myth is that if critics really understood deserts, they'd know that they are actually teeming with life. You just need to know where to look! The same is true for timber plantations.

At the scale of a timber compartment or stand, plantations are **MONOCULTURES**.



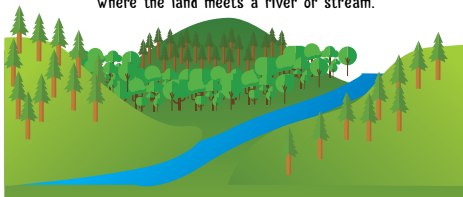
At a **LANDSCAPE LEVEL** they actually contribute to **CONSERVING** biodiversity.



## WHAT'S CONSERVED?

Conserved riparian areas\*, grasslands and indigenous forests provide important habitats for flora and fauna and increase water production.

\*A riparian area is the interface where the land meets a river or stream.



As a result, there is a network of wildlife corridors running through plantations.

### AERIAL VIEW



PLANTATION CORRIDOR

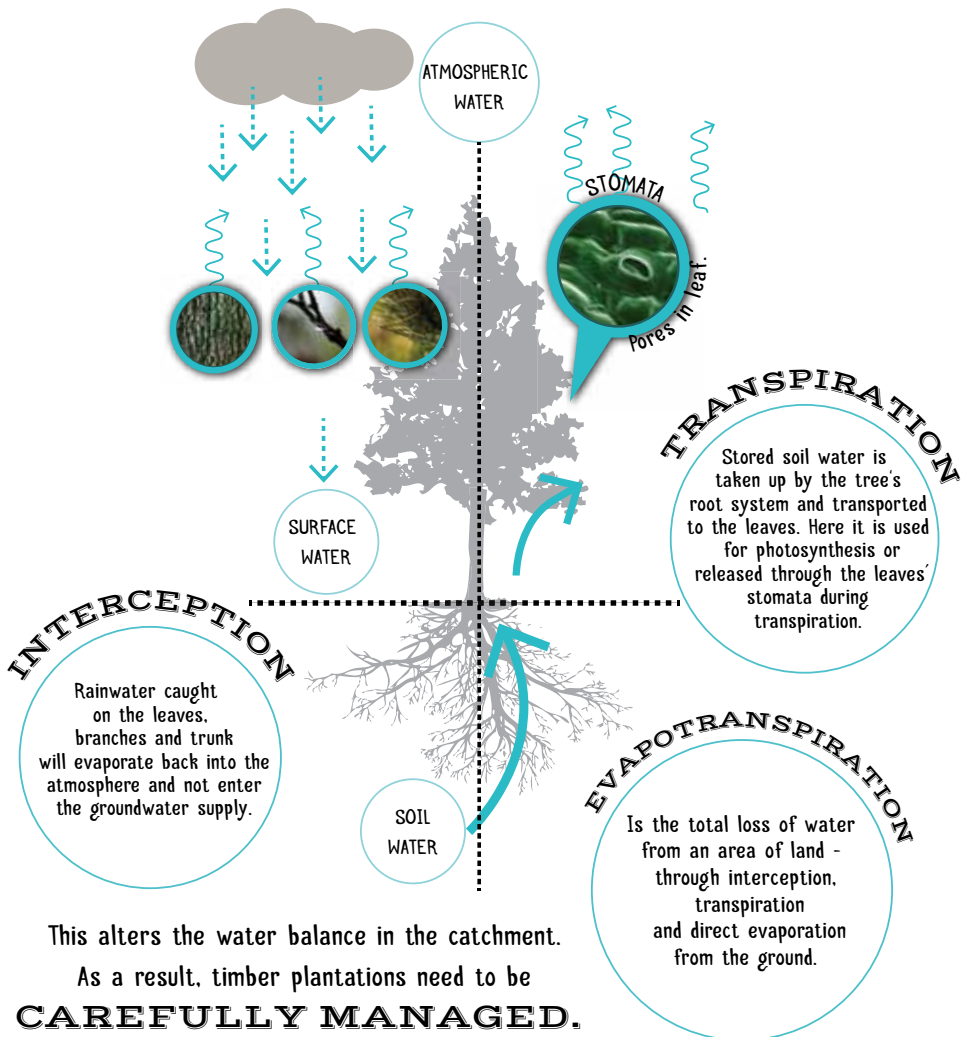
**CREATED, MANAGED AND PROTECTED**

by timber plantation owners in South Africa.

# WATER USE IN FORESTRY

## TIMBER PLANTATIONS ARE NOT IRRIGATED.

However, forestry does use around **3%** of the country's available water. The trees use soil water to produce energy through photosynthesis and release it through their leaves during transpiration. They also prevent a percentage of the rainwater reaching the ground, as a result of interception. This alters an area's water catchment. It is for this reason that the commercial forestry sector pays a stream flow reduction tax.

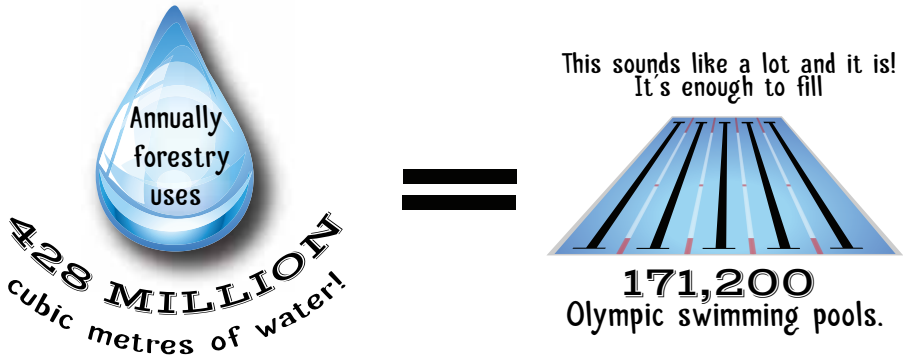


This alters the water balance in the catchment.

As a result, timber plantations need to be

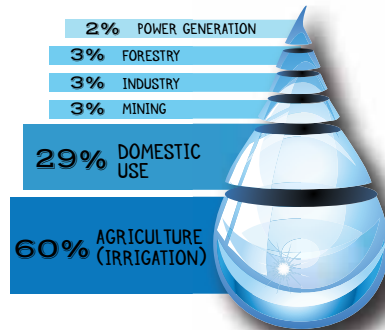
**CAREFULLY MANAGED.**

# WHY WATER IS REGULATED IN FORESTRY?

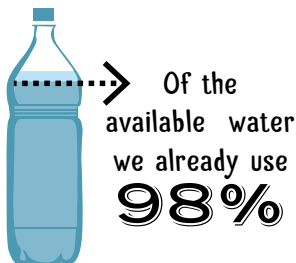


But when you place it in the context of the total water used each year in South Africa by all sectors and users.

**12,871 million cubic metres.**



## ANY WATER SAVING IS IMPORTANT



450mm rainfall annually

**SOUTH AFRICA = 30<sup>th</sup>**  
driest country in the world

**350mm LESS**  
than global average.

# THREATS TO TIMBER PLANTATION HEALTH

There are numerous threats to tree health, which can leave the tree weakened, damaged or dead! These can be grouped into two categories, **ABIOTIC** (non-living) factors and **BIOTIC** (living) factors.

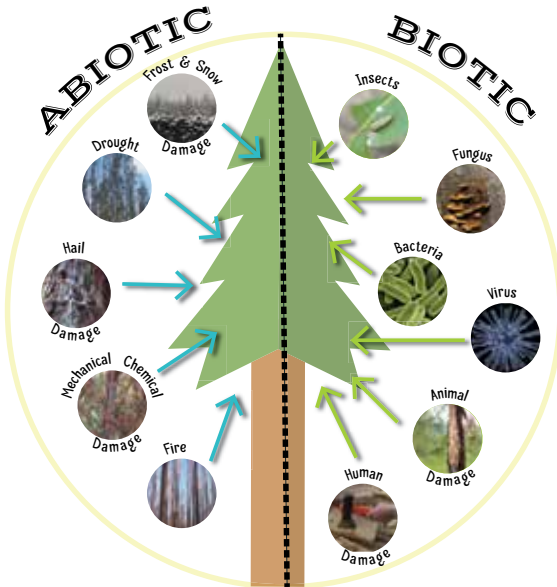


Photo Credit - Jacqui Meyer

Many organisms interact with trees. It is only when they affect the timber plantation in a detrimental or harmful way, that they become a pest.

## KEY SIGNS TO TELL THE DIFFERENCE

Abiotic	Biotic
Not host specific (numerous different tree genus affected)	Mainly host specific (usually one genus affected)
Non-infectious	Can spread infectious
Visible damage gradient from source spreading outward	Random damage pattern
Damage occurs at the <b>SAME</b> age / development stage	Damage occurs at <b>DIFFERENT</b> ages / development stages

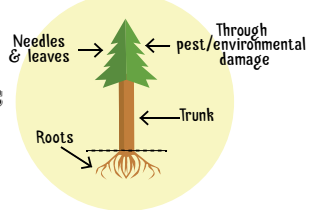


# TIMBER PLANTATION DISEASES

## WHAT IS A DISEASE?

A condition caused by a living organism or environmental change that impairs the normal functions of the tree.

## WAYS DISEASE ATTACKS A TREE



## THE MAJOR PLANTATION DISEASES

Below are the major plantation diseases and the tree species they affect.

KEY: Pine: ↑ Wattle: ↑ Eucalyptus: ↑

### TRUNK AND STEM DISEASES

- Ceratocystis Wilt (Pine)
- Botryosphaeria Canker & Die Back (Pine)
- Diplodia sapinea (Pine)
- Pitch Canker (PCF) External (Pine)
- Pitch Canker (PCF) Internal (Pine)
- Coniothyrium Canker (Pine)

### LEAVES AND NEEDLE DISEASES

- Dothistroma Needle Disease (Pine)
- Wattle Rust (Wattle)
- Mycosphaerella Leaf Disease (MLD) (Pine)
- Powdery Mildew (Pine)
- Bacterial Blight (Pine)
- Teratosphaeria suttonii (Pine)
- Destructant Leaf Blight (Pine)

### ROOT DISEASES

- Rhizina Root Rot (Pine)
- Armillaria Root Rot (Pine)
- Fusarium circinatum (FCF) (Pine)
- Phytophthora Root Rot (Pine)
- Bacterial Wilt External (Pine)
- Bacterial Wilt Internal (Pine)

# VALUE OF A SAWLOG TREE

## TIMBER'S VALUE

3 factors influence timber's end use and therefore its **VALUE.**

1. Straightness/taper
2. Knots and damage
3. Thickness

## HOW TO IMPROVE RATIOS

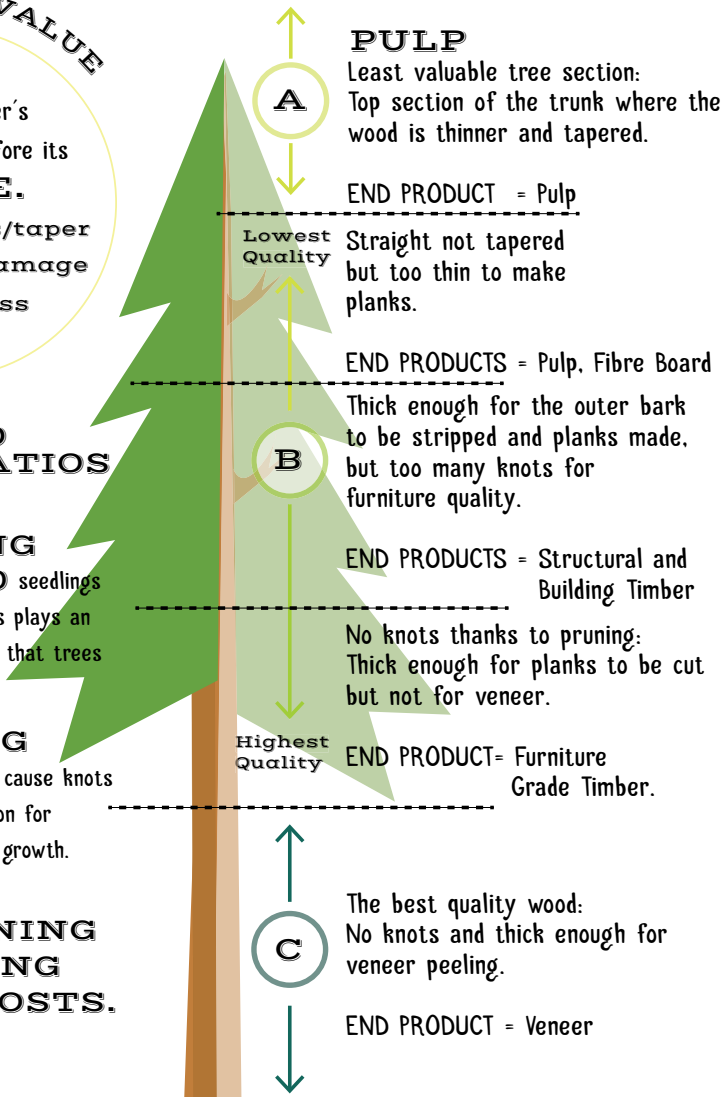
### THINNING

Going from over **1,000** seedlings to **200** harvested logs plays an important role in ensuring that trees grow optimally.

### PRUNING

Remove side branches that cause knots and force competition for light which increases growth.

However, both **PRUNING** and **THINNING** increase **INPUT COSTS.**



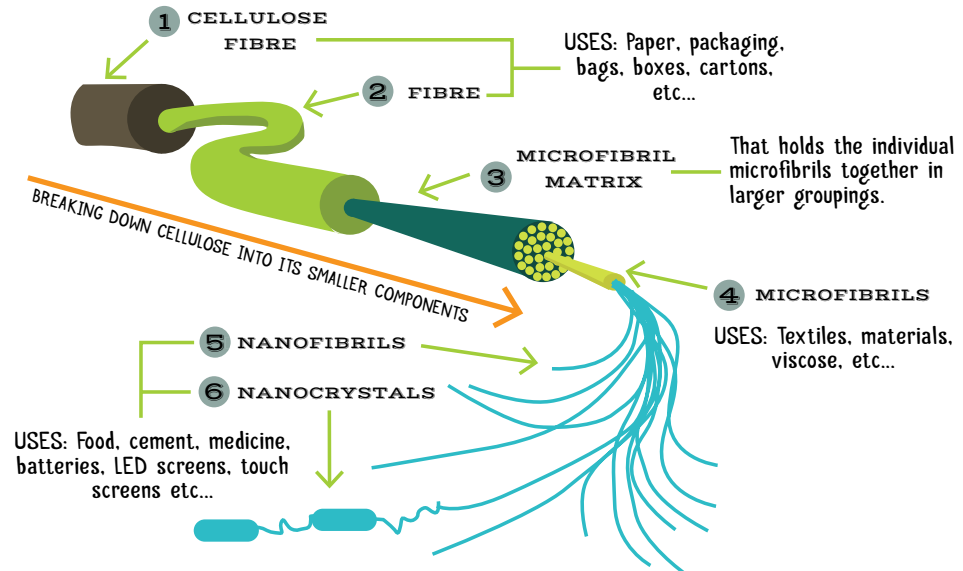
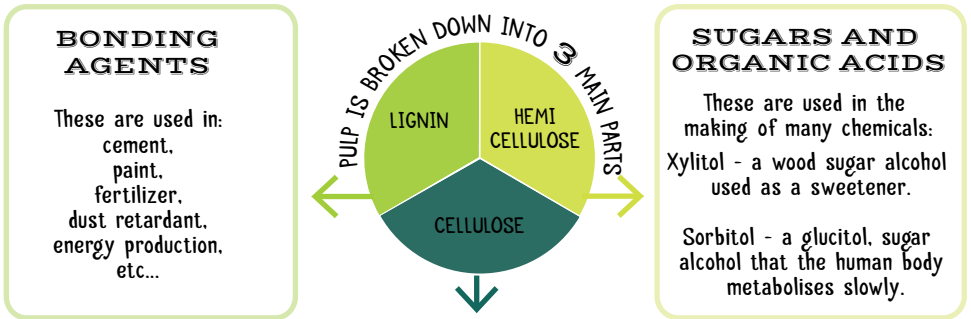
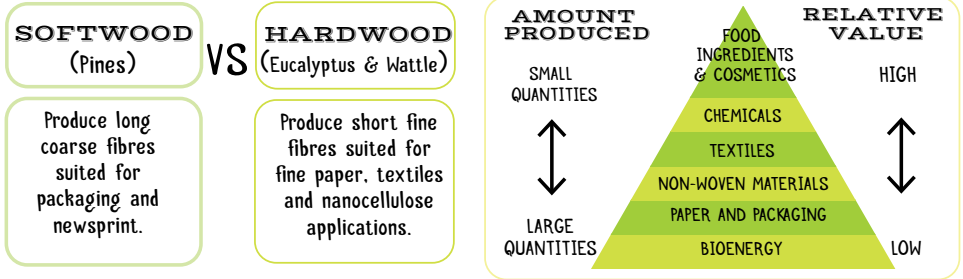
**FORESTRY** is a balancing act!

Getting the **BEST** output for the **LOWEST** input costs.

# VALUE OF A PULP LOG

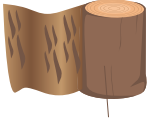
When it comes to pulp logs, some can be worth a lot more than others. Value depends on on a number of factors, including:

- 1) the species of tree; 2) whether it is a soft or hardwood; 3) the pulping process involved; and 4) what it will finally be used for.



# END PRODUCTS

## BARK REMOVAL

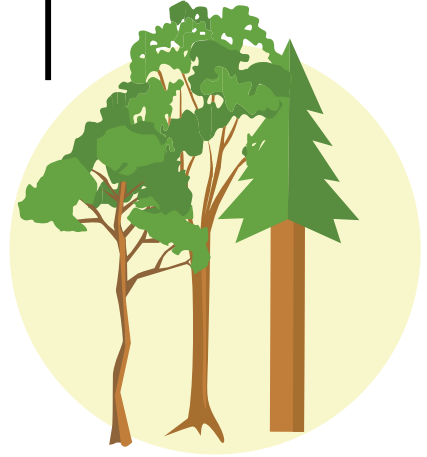


Wattle has valuable tannins in the bark.

Bark is dried in strips, chipped and then boiled.

Forming a liquor (tannin extract) that is then used in:

- Tanning leather
- Adhesives
- Pharmaceutical products
- Preservatives



## THINNING & HARVESTING



## ROUNDWOOD

for products other than sawlogs e.g. pulp, poles, mining timber, charcoal etc.

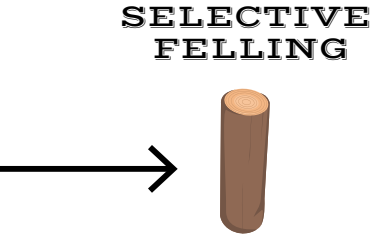
## PULP PRODUCTION



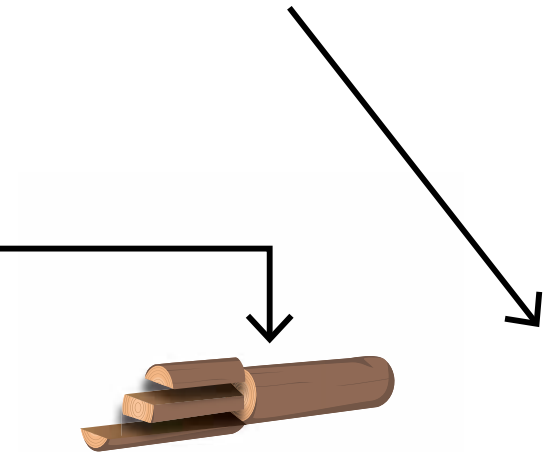
Turning a solid tree into a versatile liquid that makes far more than just paper.

- Composites
- Paper
- Filters
- Packaging
- Insulation
- Textiles
- Medical consumables
- Diaperstock

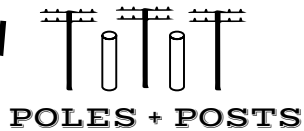
The list goes on with more uses being added as science discovers new ways to harness the potential of wood and fibre products.



Selective removal of long, straight, thick trunks.



Making a square plank from a round log is the real challenge as sawmillers need to optimise the process and get the most from each log.



**FACT:**  
Removing the largest trees for markets with higher returns per tonne can provide a profitable secondary revenue stream.

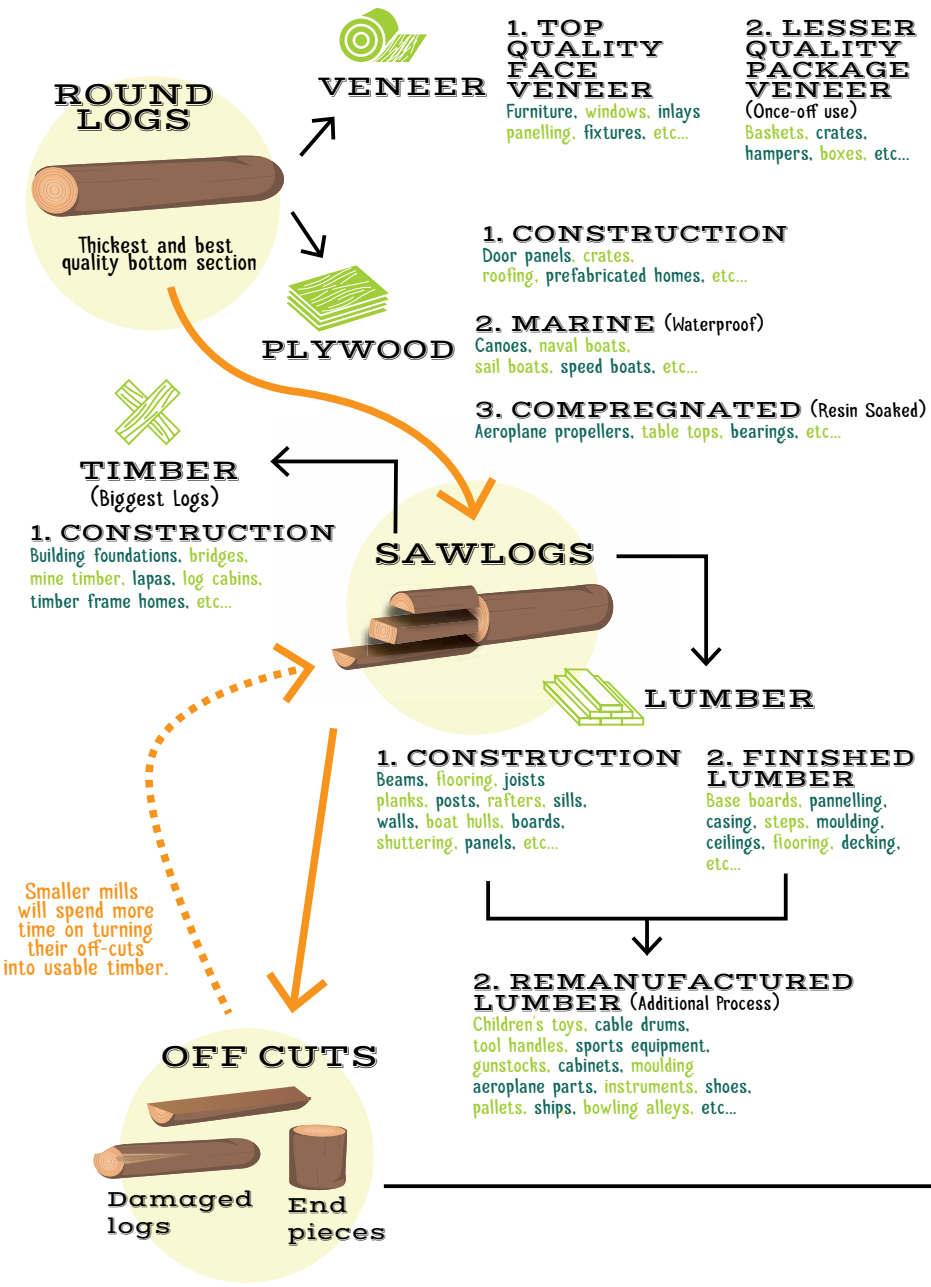
**THE WONDER OF WOOD**

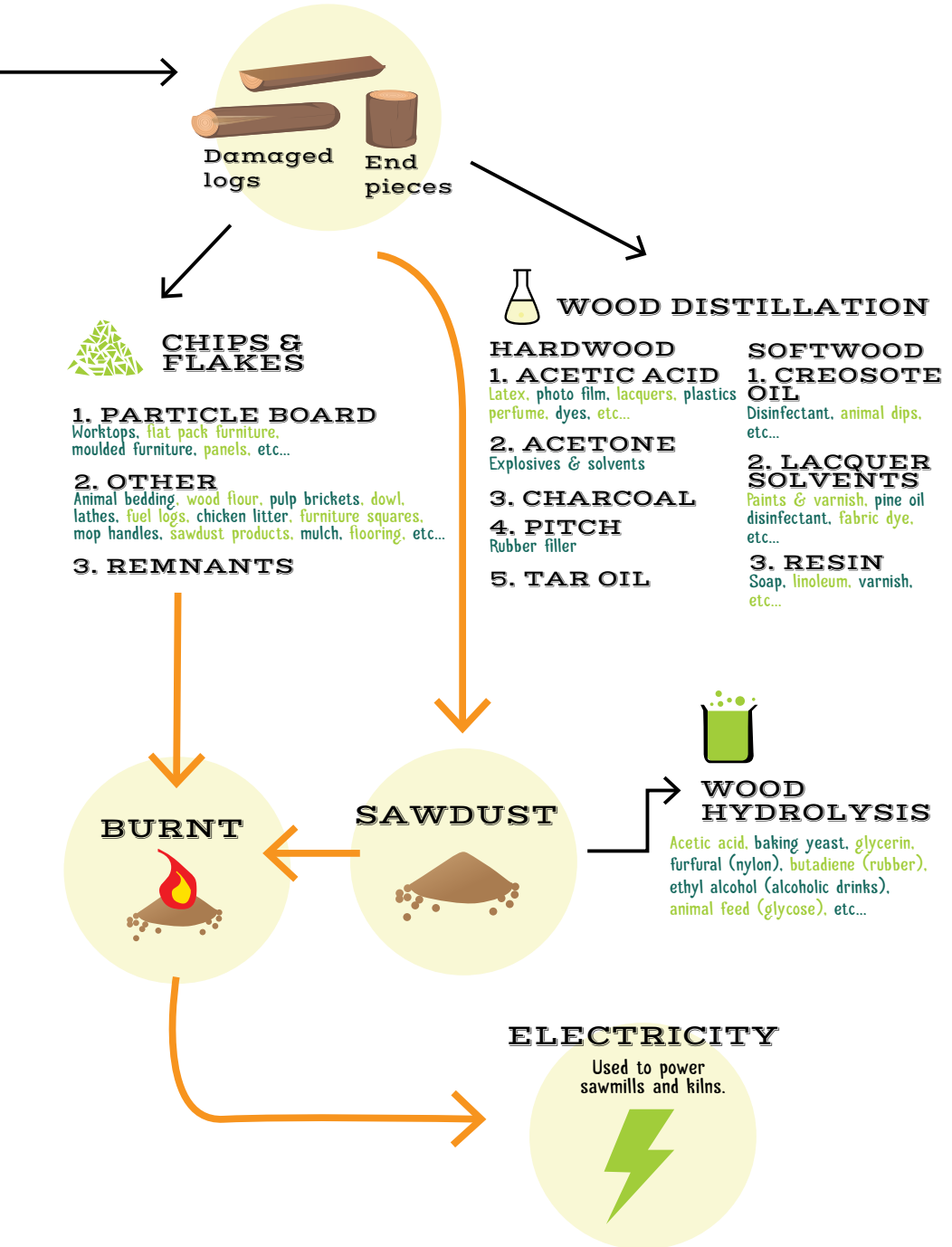
One of the amazing aspects of wood is how many end products can be made from farmed trees. From printer paper to underwear, timber to tar oil, our wood is turned into hundreds, if not thousands, of products. Some you will instantly recognise, others you would never believe were originally made from wood.

As a versatile, sustainable, carbon neutral alternative, wood not only has multiple uses it also has multiple reasons to be chosen over the alternatives. This often makes wood the most environmentally and socially responsible, cost-efficient and desirable choice.

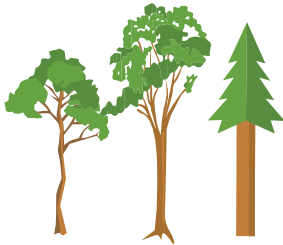
We are proud of the jobs it creates and its contribution to South Africa's economy. We are also proud of the basic needs it fulfils and even the convenience our products bring to people.

# FROM SAW TO SAWDUST





# FROM FOREST TO PULP



WATTLE,  
EUCALYPTUS  
+ PINE



Round logs  
+  
By-products



Damaged logs



Branches



Edge pieces



Bolts



DEBARKING

## PULPING

### 1. DISSOLVING PULP

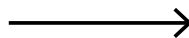
Makes plastic -type products:

Cellophane, explosives,  
rayon, film, lacquers,  
etc...

### 2. MECHANICAL PULPING

Made into tiny particles:

All forms of paper,  
newsprint, telephone  
directories, magazine  
paper, etc...



WOOD CHIPS  
+  
WOOD PELLETS



# PROCESS

**3. SULPHITE or SULPHATE or SODA**

Paper, paper-based products & packaging, etc...

**4. SEMI CHEMICAL**

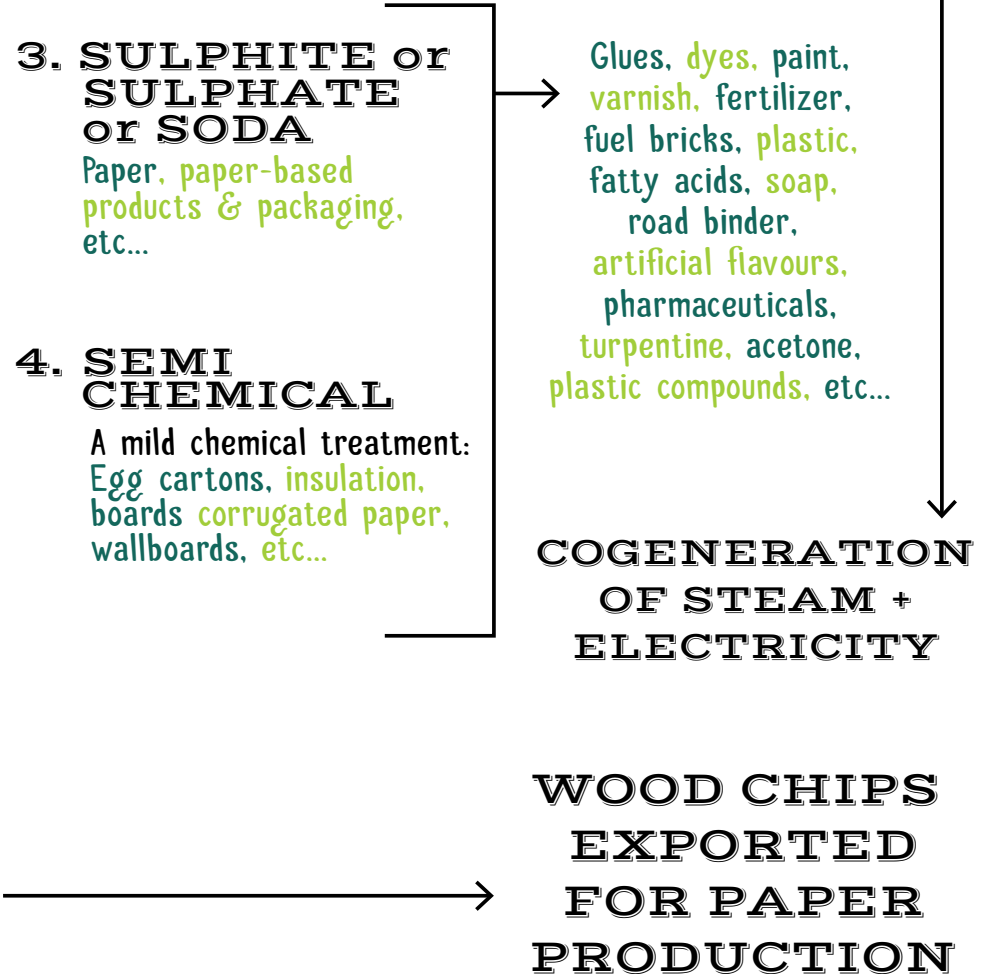
A mild chemical treatment:  
Egg cartons, insulation, boards corrugated paper, wallboards, etc...

**PULP  
+  
LIQUOR**

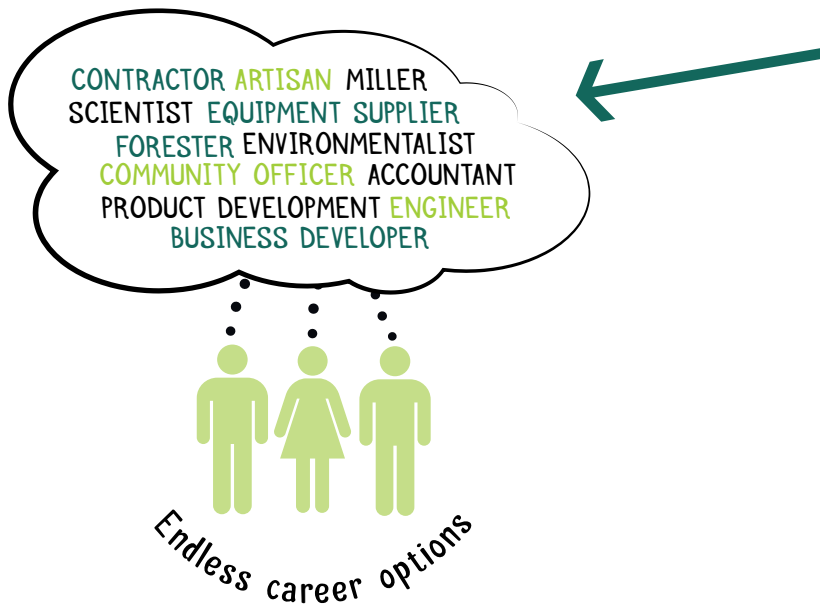
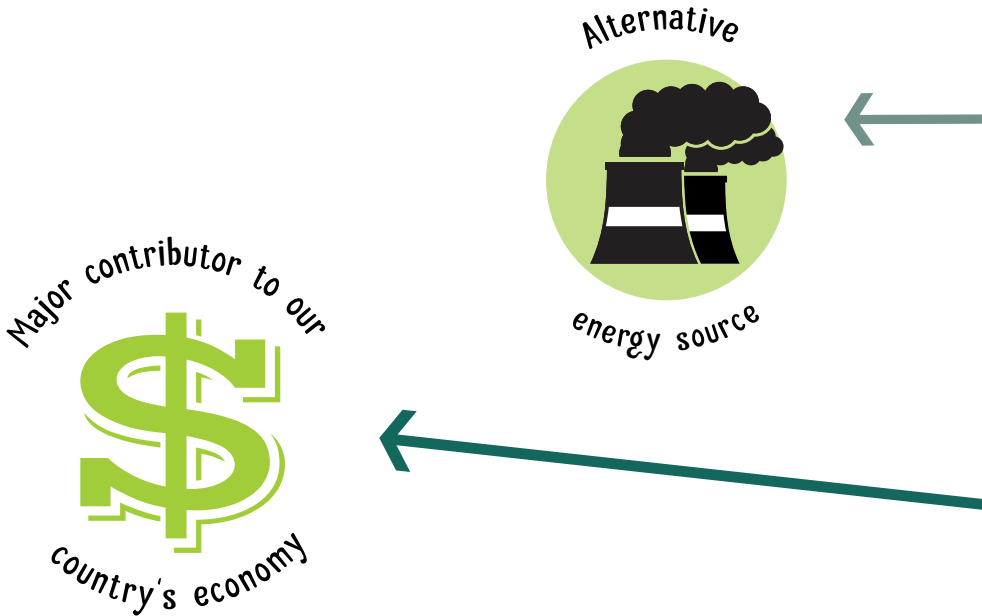
Glues, dyes, paint, varnish, fertilizer, fuel bricks, plastic, fatty acids, soap, road binder, artificial flavours, pharmaceuticals, turpentine, acetone, plastic compounds, etc...

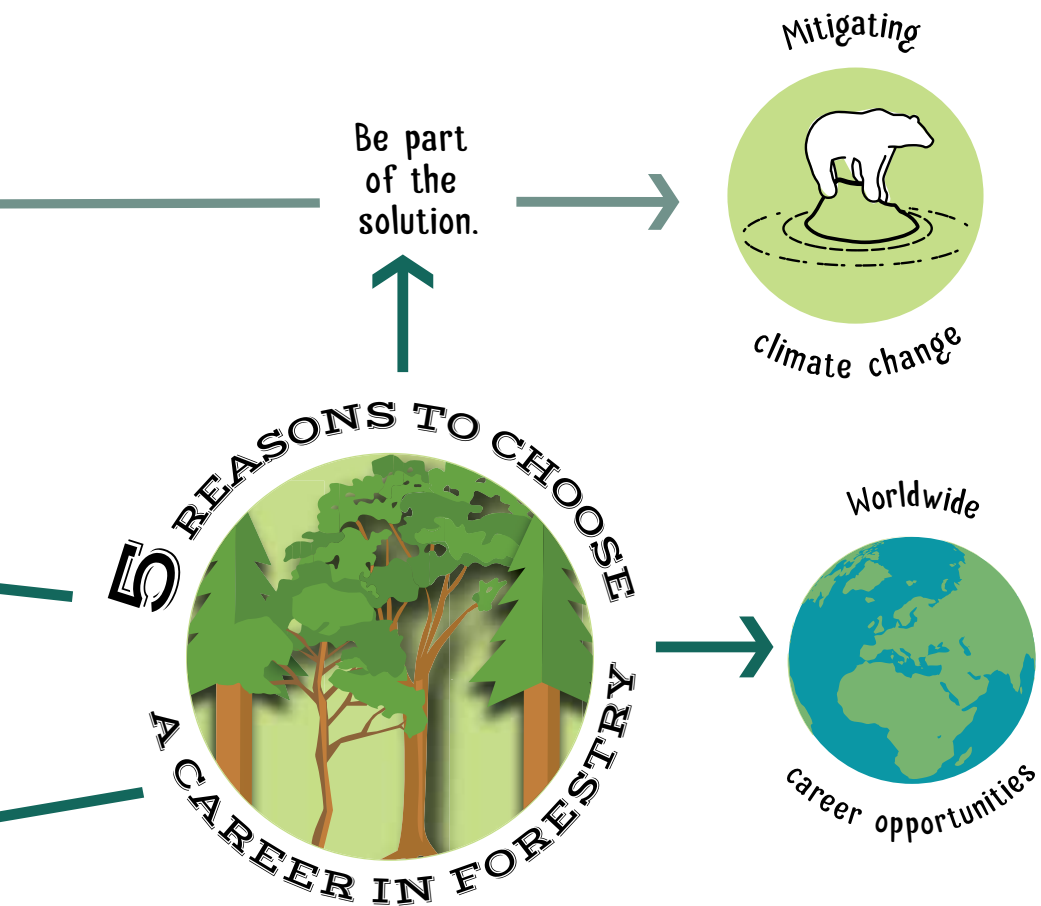
**COGENERATION OF STEAM + ELECTRICITY**

**WOOD CHIPS EXPORTED FOR PAPER PRODUCTION**



# CAREERS IN FORESTRY





Work in some of the most beautiful parts of the country.







**FORESTRY SOUTH AFRICA**

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