

---

# PRODUCTS BENEFITS AND SERVICES FROM THE FOREST

---

# FACTS



## Introduction

Forests are crucial to people everywhere in the world. In fact it is pure magic. Sun, air, water and some nutrients are all that is needed, and then chlorophyll and the photosynthesis do the rest. The trees grow and the forests provide for a range of resources we depend on. It would be impossible to get through a day without using something that derives from forest. It could be firewood, newspaper, furniture, medicines or food. These are all products we can directly relate to forests, but they also cater for less obvious benefits and services.

1.	PRODUCTS FROM THE FOREST	2
1.1.	Wood	2
1.2.	Wood based chemicals	3
1.3.	Food	3
1.4.	Paper	4
1.5.	Energy	5
1.6.	Medicines	5
1.7.	Innovation from the forest	6
2.	BENEFITS AND SERVICES FROM THE FOREST	7
2.1.	Ecology	7
2.2.	Sociocultural services	8
3.	GLOSSARY	11

1

## 1. PRODUCTS FROM THE FOREST

### 1.1. Wood

We can use wood for making houses, furniture, boats, and bridges. The list is almost endless as there are very few things that cannot be made from wood. The great thing about using wood as building material is that it is very environmentally friendly. Compared to other materials like steel or concrete, wood had no CO<sub>2</sub> offset during production since it grows naturally. In fact it collects the CO<sub>2</sub> and stores the carbon, and the storing of carbon continues in the product until it is decomposed or burned.

#### Building material

Wood is historically one of the most used resources for constructions. Wood has excellent qualities like durability, usability and strength that still make it a number one choice in many countries in the world. It's by far the most versatile material existing and can be used for construction, planking, panelling, roofs or for more decorative purposes. It can be used for



Photo: Anna Lena Albertsen, Norway

anything from small houses to 100 metres long glulam bridges. Compared to its own weight it is extremely strong. This applies to everything from big logs to the smallest particles of fibres.

The technique of glulam makes it possible to build huge buildings like airports or sports stadiums. Glulam is a type of structural timber product composed of several layers of dimensioned timber bonded together with durable, moisture-resistant adhesives.

#### Wooden products

Inside a house you will always find products made from wood. Wooden furniture is one of the earliest, and most important, inventions intended strictly for human comfort and pleasure. The first musical instruments ever made, were made from wood and it is still an important material for many instruments. Floors, window frames, doors, kitchen benches and cabinets are just some of the products made from wood often found in homes.

Outside the house you can see fences made from wood, or a child on a skateboard. Perhaps you take a trip in a wooden boat, departing from a jetty made from wood. Basically we are surrounded by wood in our daily life in one way or another.



Photo: Forestry Extension Institute, Norway



### 1.2. Wood based chemicals

Trees do not only provide us with wood. Many chemicals are extracted for different uses ranging from medicine to industrial purposes. The great benefit is that “green chemistry” can be used to replace or reduce chemical products that have a negative environmental impact. The two major sources for green chemistry are lignin and cellulose;

#### Lignin

A tree is made up of wood fibres that are kept together with a substance called lignin. The lignin can be extracted and used both as a binding and a dispersing agent in products like paint and concrete.

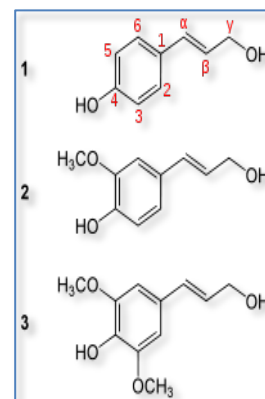


Illustration: Wikipedia

From lignin it is possible to extract the delicious vanillin. It tastes almost exactly as vanilla, but is much cheaper. Most food with vanilla flavour is made from vanillin – consequently trees!

#### Cellulose

Cellulose is perhaps best known as the raw material for paper. But it has many other purposes as well. Recent technology has made it possible to make plastic from cellulose. That is far more environmentally friendly than the plastic we are familiar with, which is made from oil.

3

Cellulose is also used for food. Cellulose powder serves as an excellent thickener that makes water and other liquids viscous/thick and sticky. This is why it is used in for instance toothpaste. Pills are made mostly from cellulose as the actual amount of medicine is so tiny it would be impossible to eat without some sort of filling that increases the size to something we can pick up and eat. Viscose (rayon) is a fabric also made from cellulose and is used for clothing.

#### Sugar

Wood contains a lot of sugar-containing compounds. By adding yeast one can produce alcohol which can be used as methylated spirits and window washer fluid. The fermentation process produces carbon dioxide (CO<sub>2</sub>), which is captured and used in carbonated soft drinks.

### 1.3. Food

The forest is a great provider of food. Lots of animals live in the forests and most cultures have a long history of hunting game for food, not only animals but also, birds, fish, reptiles and insects. In many parts of the world, like Europe and North America, is hunting today mostly for recreational purposes as all food can be bought in shops, and there is no real need for hunting one’s own food.

But the forest can provide more than meat. Fruits, berries, mushrooms, herbs and eatable plants are found in all forests to some extent. In some countries it is a part of daily life to gather food from the forest, while in others it is part of recreational habits.

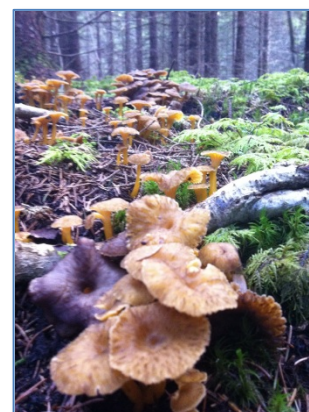


Photo: Nina Ree-Lindstad, Norway

## FACTS

### 1.4. Paper

Paper is a product from nature, and the raw material comes from trees and other plants. Today it's hard to imagine a world without paper. We have books, money, packaging and even filters in cars to mention a few. It comes in different shapes and qualities depending on what we use it for. Paper can be recycled and used over and over again, and that is good for the environment. There are three major categories for the different uses of paper;

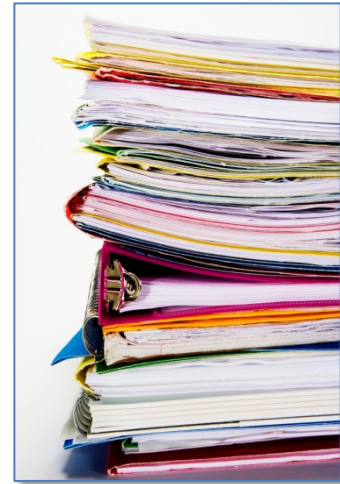


Photo: MS Clip art

#### Paper for print

One of the most important purposes of paper is to distribute information. Paper is the carrier of information and culture through books and magazines. Historically paper has played an important part in distributing news and freedom of speech. Paper today has many competitors for these tasks, but despite digital technology –and internet in particular, paper has not disappeared. Newspapers are still printed on paper; even though they can be read on internet, concert posters are still posted on walls and surveys show that most people prefer a birthday card of paper instead of a digital card.

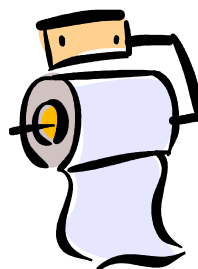
#### Paper for packaging

4

Packaging is for protection, information and sale. It is the second largest range of use for paper and carton. Good packaging is expected to protect goods all the way from the factory to the shop and from there to the home of the buyer. It should be informative and let consumers learn about the product without opening it. Packaging is also important for sale. Lots of effort is used on design to make the products most appealing to target groups. There is continuous research on paper and paper products to improve and create new products.

#### Paper for hygienic use

This kind of paper has totally different requirements than the ones mentioned above. Household paper like napkins or toilet paper should be soft and absorptive. It is made from a different type of pulp and is not as strong as paper for print or packaging, but it makes use of the natural absorbance power of cellulose fibres.



FACTS

1.5. Energy

Bioenergy comes from any fuel that is derived from biomass - recently living organisms or their metabolic by-products. Bioenergy is energy from nature – plants and trees.

The energy from the biomass is the solar energy which the trees and plants collected when they were growing. Bioenergy is an environmentally friendly alternative to fossil fuel. In modern forestry every part of the tree is used. The bottom part of the tree trunk is used for building material, the upper part for paper, and what is left over will be used for energy.



Harvesting residue  
Photo: Forestry Extension Institute, Norway

Bioheat from forests

Bioenergy comes in many shapes. Residues from harvesting can be chopped into chips, sawdust can be compressed into pellets, but it can also be regular logs for firewood. Bioenergy can be used directly for heating or to make electricity.



Fire wood  
Photo: Forestry Extension Institute, Norway

Biofuel from forests

The forest is also about to become a competitor to fossil fuel. Ethanol and biodiesel have been criticised as source for fuel as they are made from food plants such as corn, sugar canes and rape seeds. Research on second generation biofuel suggests that forests can be a contributor, and they are currently studying how residues from harvest operations can be used for fuel production.

1.6. Medicines

A great amount of the products in grocery stores are from the tropical forests: coffee, cocoa, coconut, vanilla, bananas, pineapples and pepper, just to mention a few. At the drug store, there is an equally impressive amount of products that originate from the forest. That is not surprising knowing that more than half of the world's plant species are natives of the tropical forest.

In an environment with great competition from other species and the threat from myriads of insects, bacteria and fungi, tropical plants have developed a wide range of chemical compounds. These chemicals have given us drugs to treat cancer, malaria, heart disease, bronchitis, dysentery and tuberculosis to mention a few. In addition there are common drugstore products like headache tablets and cortisone ointment. In fact, over 120 pharmaceutical products are plant-derived, with a large portion originating from tropical species.



Photo: MS Clip art

## FACTS

However, medicinal plants are not only from tropical forests. To natives all over the world, the forest has been a great source for natural medicines. Trees live longer and grow larger than annual plants, and will therefore contain greater amounts of chemical defense.

Recent research has shown that the Nordic spruce contains large amounts of compounds that may have preventive effects on common and wide spread diseases like diabetes, cancer and cardiovascular disease.

### 1.7. Innovation from the forest

Research and development keeps pushing the limits for how we can make use of wood, and new products and usages emerge.

**Nano technology** has made researchers in Sweden able to make the world's strongest paper. It is seven times stronger than normal paper and water resistant. Being solid as iron it is impossible to hit a nail through it.

**Plastic** is usually made from oil or natural gas, which cause emissions of CO<sub>2</sub>. But it can also be made from cellulose. Toothbrushes and instrument panels in cars are already being made from trees, but we can assume the use will increase in the future.

**Wood for food** is already a reality, but the range of products keeps increasing. Food additives are often synthetic but many can be replaced by natural ingredients. Cellulose can be used as skin for sausages, and it acts as an excellent binder in frozen food and milk based drinks, to mention a few.

**Paper and technology** can create new exciting products. Intelligent medicine wrapping can help a patient knowing when to take a pill, and it can communicate directly to the doctor and pharmacy when new pills are needed. Intelligent wrapping can also prevent piracy of products.

New technology has made it possible to make drink cartons for milk and juice that do not need refrigerated truck for transportation. This prevents food from being destroyed before it reaches its consumers.

Research and development in wood based technology makes it possible to build even taller, stronger and more durable buildings from wood. They are also fire resistant, and since the building material is wood, it is far more environmentally friendly than other building materials.



Photo: MS Clip art

6



## 2. BENEFITS AND SERVICES FROM THE FOREST

Forests are unconditionally linked to human survival. They are called the “lungs of the earth” and for a good reason. Through the photosynthesis trees create the air we breathe and they are the reason why life outside of water became possible in the first place.

### 2.1. Ecology

Ecology is the scientific study of the relations between living organism and their environment.

#### Water

Forests interact closely with the water cycle. Like a giant sponge it soaks up rainfall during wet seasons and helps water percolate into the soil - the storehouse of water. During dry seasons they pump the water back into the atmosphere through evaporation and plant transpiration. In this way the forest regulates the groundwater level which is the biggest water resource for people on earth. Forests also contribute to the maintenance of good water quality. They significantly reduce soil erosion which in turn reduces the level of sediments in rivers and lakes. They also filter and trap some pollutants. Without forests rainfall would cause floods and soil erosion. Most of the nutrients and the elements needed to maintain life would then be washed away.

#### Biodiversity

Only about 1.2 million species on earth are catalogued. Yet scientists estimate the planet could be home to as many as 8.7 million different species of animals, plants, fungi and micro-organisms. All these species and their habitats represent the world’s biological diversity – biodiversity. On a daily basis humans use more than 40 000 species for food, shelter, medicines and clothes.

We greatly value the biodiversity, yet only fractions of known species have been examined for its values for humans. However, the more we learn the more we understand how much the world depends on it. Forests are the most diverse ecosystem on land, and provide perfect habitat for life. We have tropical, temperate and boreal forests, which each offer unique and diverse habitats for plants, animals, fungi and micro-organisms. In fact forests contain more than 80 % of the world’s terrestrial species. Tropical forests are home to as much as 50% of the species living on our planet yet it covers less than 5 % of the Earth’s land surface.

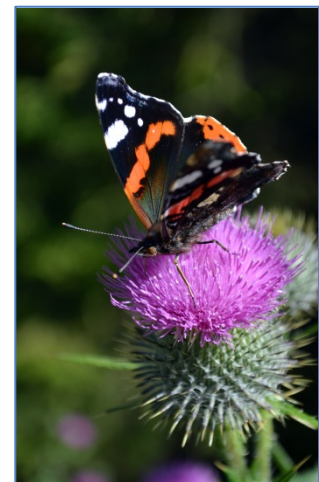


Photo: Terje Johannessen, Norway

#### Fighting global warming

Climate change and global warming are acknowledged as some of our biggest challenges today. One of the main reasons for global warming is too much CO<sub>2</sub> in the atmosphere caused by human activities. CO<sub>2</sub> is naturally present in the atmosphere, and it is a good thing because it traps warm air and provides a temperature on earth that makes it possible to live here. But when there is too much, the temperature will increase and the impact on earth can have devastating effects.



Today we have only one means of reducing the amount of CO<sub>2</sub> from the air, and it is forests.

Through the photosynthesis trees capture CO<sub>2</sub> from the air. The carbon is stored in the wood and the oxygen is released back into the air. So not only do the trees clean the air, they also store the carbon throughout its life cycle. The forests act as a carbon sink. If the tree dies and decomposes naturally, the carbon stored will be released back into the air. But if the wood is used for building a house, the house will continue to store the carbon. If the source for wood-based products is sustainably managed forests, the products are considered environmentally friendly.

## 2.2. Sociocultural services

People who live in or near a forest have a relationship to it in one way or another.

### Recreation

Some people enjoy a quiet peaceful walk in the forest. A walk in the forest will let you experience new smells, sound of birds, perhaps even a view of animals in their natural habitat. They provide for a great source for food, and in many cultures there are long traditions for hunting and to collect berries or mushroom. Others use it for spiritual or religious means.



Photo: Terje Johannessen, Norway

### Religious and spiritual

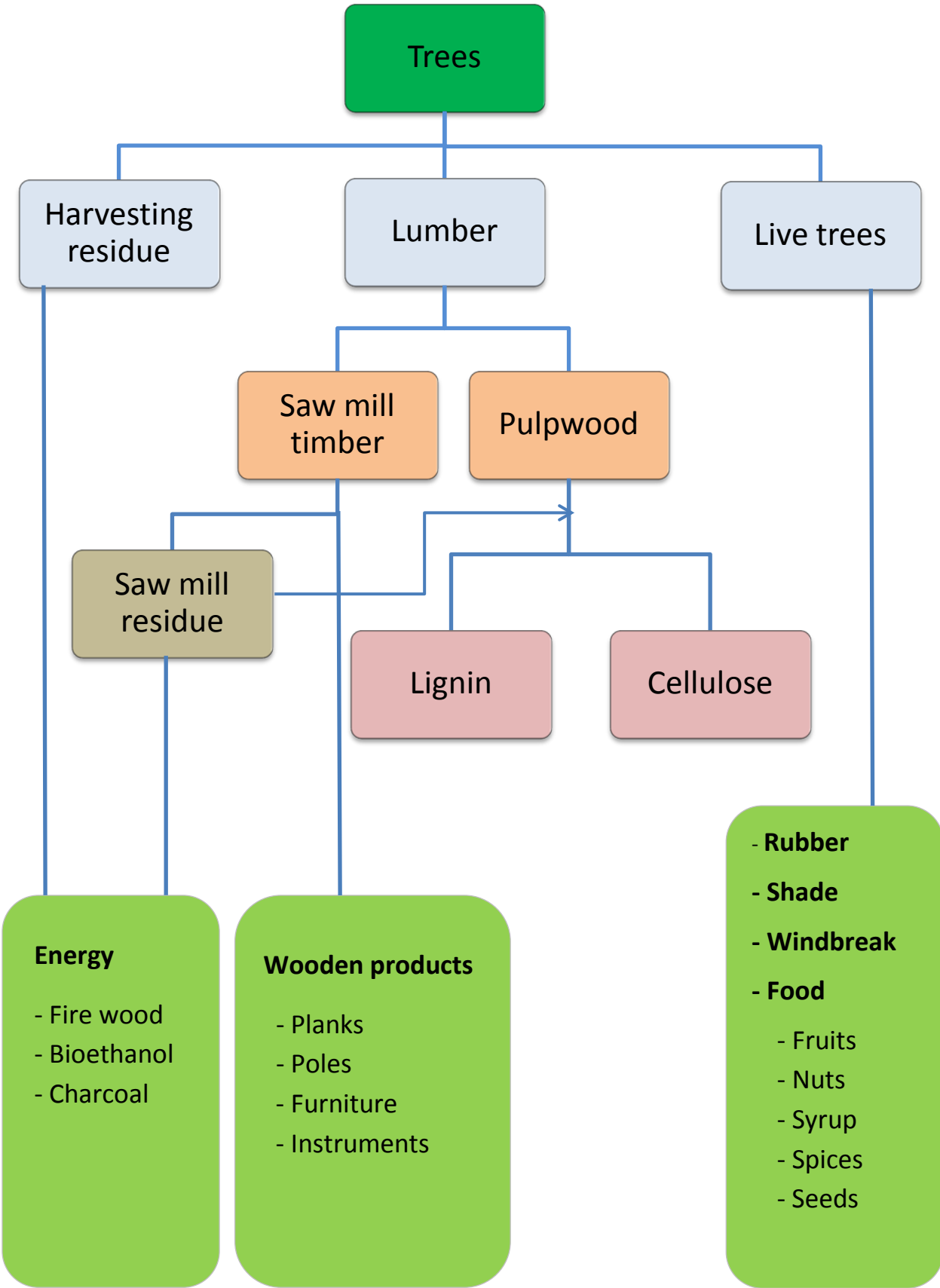
Many religions are tightly linked to nature. Some, like Hinduism, consider trees and plants as equal individuals to humans. In any case nature can provide silence and scenery for meditation and spiritual or religious activities. Sacred forests are often protected or untouched.

### Scenic and landscape services and values

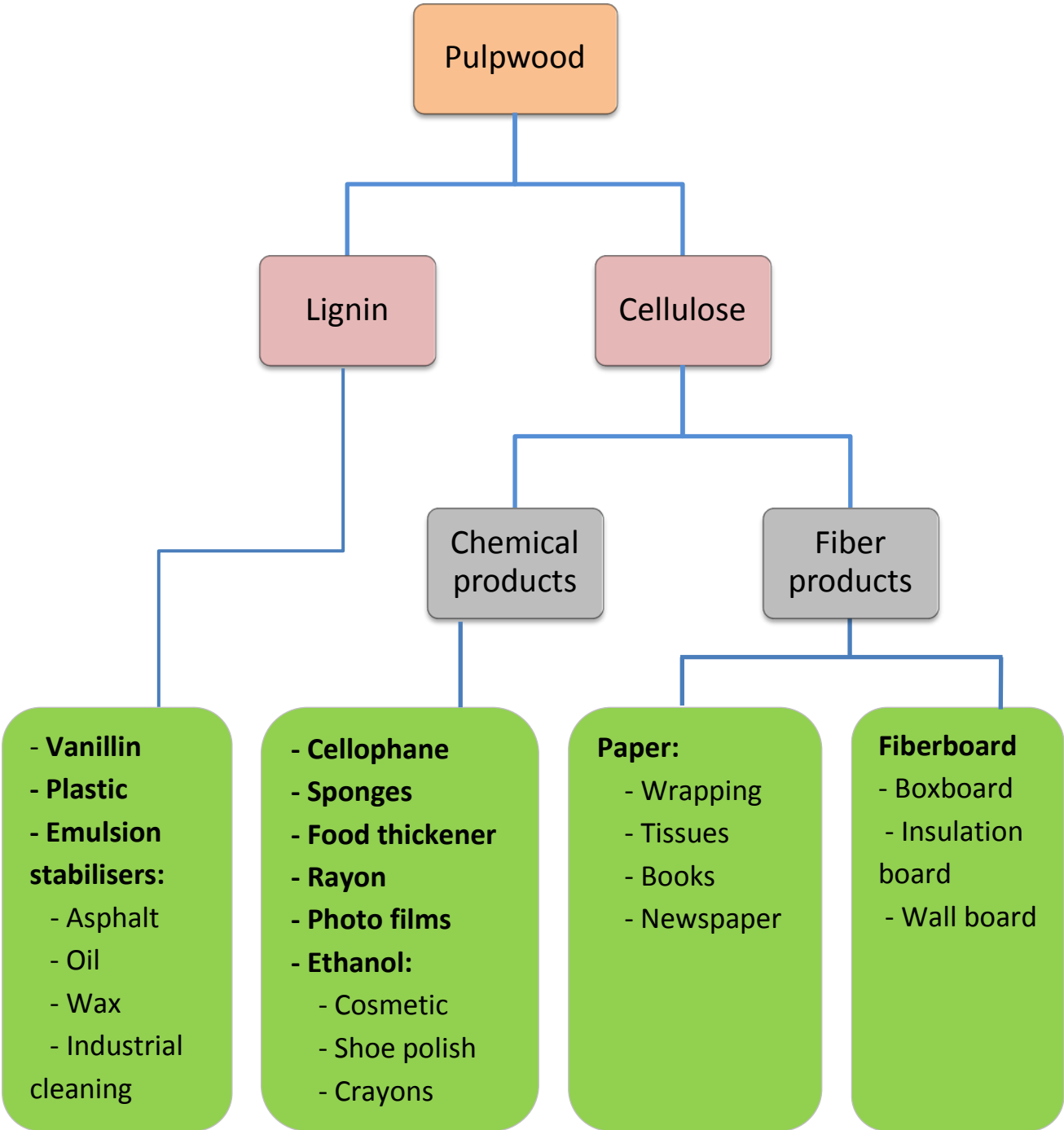
Imagine living on a planet without trees. Think of how a property can increase in value if there are old beautiful trees on the land. Many people value beautiful scenery, particularly when on holiday. Many hotels and resorts are built in or near a forest because it gives pleasant surroundings.

FACTS

9



10



### 3. GLOSSARY

**Afforestation:** Planting of trees on land which was never forested

**Biodiversity:** The variation of life forms within a given species, ecosystem, biome, or an entire planet

**Bioenergy:** Energy that derives from biological material

**Carbon sink:** A reservoir that absorbs or takes up atmospheric carbon; for example, a forest or an ocean

**Cellulose:** The scientific name for wood fiber

**Decomposition:** The process by which organic material such as leaves and branches are broken down by bacteria, fungi, protozoans and the many different kinds of animals that live in the soil

**Deforestation:** Removing the tree cover below the threshold value that defines a forest and converting the land to another use

**Ecology:** The science or study of the interaction between living organisms and their natural environment

**Ecosystem:** An interdependent and dynamic system of living organisms and their physical and geographical environment

**Erosion:** The process by which soil and rock are removed from the Earth's surface by the action of wind, water, ice or gravity

**Lignin:** A complex chemical compound derived from wood

**Pulpwood:** Refers to timber with the principal use of making pulp for paper production and chemical products, or for extracting lignin

**Reforestation:** planting of trees on land which was forested before

**Sustainable forest management:** Management of forests that maintains and enhances the long-term health of forest ecosystem for the benefits of all living things while providing environmental, economic, social and cultural opportunities for present and future generations

**Wood Chemicals:** Chemicals that are found naturally in the various parts of a tree





**FACTS**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



FACTS

Lined writing area for facts.





This booklet is made by Learning about Forests (LEAF) ©2013,  
and is distributed by LEAF to all its members, free of charge.

You are welcome to edit, translate and redistribute the entire content, but strictly for non-  
commercial and non-profit purpose.

If photos are redistributed, remember to credit the owner.