



LESSER-KNOWN & LESSER-USED TIMBER SPECIES

UTILISING GHANA'S SUSTAINABLE
TIMBER RESOURCES



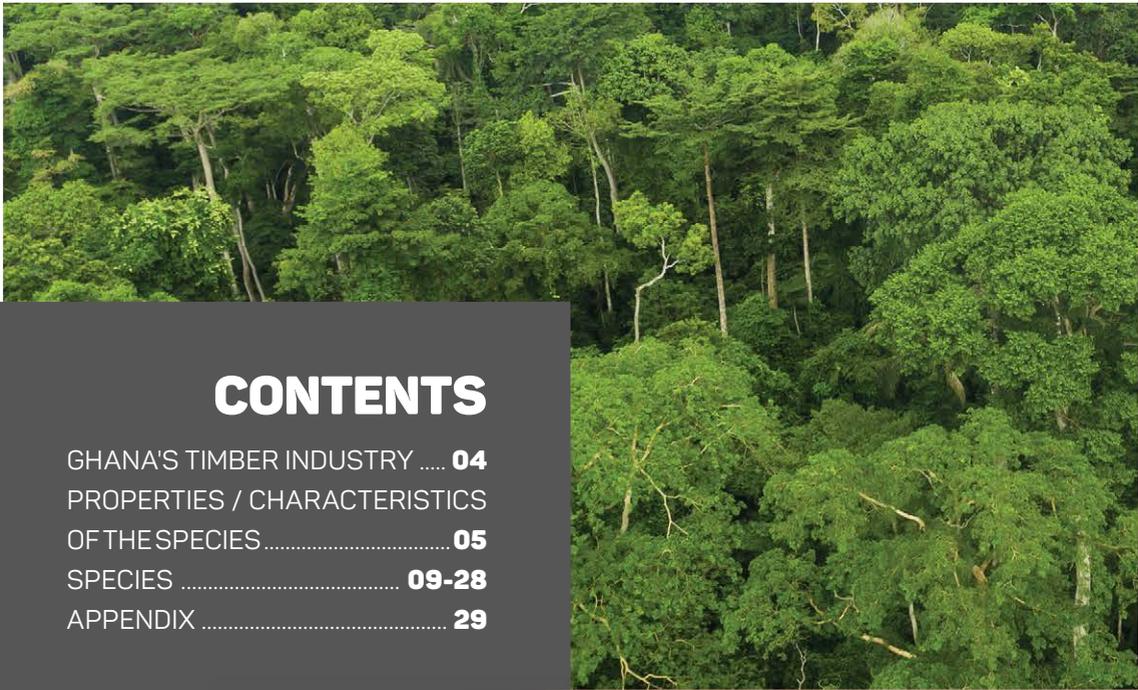
BVRio is a non-profit organisation founded in 2011 with the objective to create and promote the use of market mechanisms to facilitate environmental objectives. Originally created in Brazil, BVRio now operates internationally. BVRio's work is focused around four ambitious goals: climate change mitigation, sustainable forest management, sustainable agriculture, and circular economy. One of BVRio's major programmes to achieve sustainable forest management is the promotion of trade in legal and certified timber from tropical countries. As part of this, in 2016 BVRio launched the **Responsible Timber Exchange**, an online negotiations platform for sourcing legal and sustainable timber products.



The Forestry Commission of Ghana is responsible for the regulation of utilisation of forest and wildlife resources, the conservation and management of those resources and the coordination of policies related to them. The Commission's aim is to be a corporate body of excellence in the sustainable development management and utilisation of Ghana's forest and wildlife resources meeting both national and global standards for forest and wildlife resource conservation and development. Within the Commission, the Timber Industry Development Division (TIDD) provides specialised services in promoting efficiency in product quality assurance and value-addition in the Timber Industry and Trade consistent with best environmental practices.



Forestry Research Institute of Ghana (FORIG) is one of the 13 institutes of the Council for Scientific and Industrial Research (CSIR). It is located at Fumesua near Kumasi in the Ashanti Region of Ghana. FORIG undertake demand-driven research, build capacity and promote the application of technologies for sustainable management of forest resources for the benefit of society.



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GHANA'S TIMBER INDUSTRY

Ghana's vibrant timber industry has existed for more than 130 years, comprising of logging, sawmilling, veneer mills, ply mills, and moulding mills. There is an annual allowable cut of 2 million cubic metres of round logs which has been sustained over the years. All the round logs produced are locally processed following the Ghana Standard Authority (GSA) specifications that meet ISO standards. Over 80% of the exported products come from companies operating with FSC control wood and chain of custody certificates.

Ghana signed a VPA in 2009 with the EU and this has brought the industry into compliance with all the principles of sustainability. All exporting companies are assessed to meet the legal, social, environmental, and financial criteria before being issued with the export permits. With the VPA process almost complete, Ghana will soon become the second country able to issue FLEGT licenses. FLEGT-licensed timber products from Ghana will be able to enter the EU market without undergoing the due diligence checks required by the European Union Timber Regulation (EUTR).

WHY LESSER-KNOWN AND LESSER-USED SPECIES?

Lesser-known and lesser-used species refer in this booklet to *under-utilised timber species from Ghana that have similar properties to other popular species*.

There are more than 50,000 species of timber in the world, but only a small proportion of these are used commercially. Currently, Ghana has nearly 90 species that are regularly exploited and traded as timber. Lesser-known and lesser-used species can have similar and even better performance for some specific end-uses; they can also have a more distinctive and unique appearance compared to more popular ones. Using these species is not only a good business decision but also has the potential to improve livelihoods and protect biodiversity.

The 20 lesser-known and lesser-used species from Ghana displayed in this booklet have been selected based on their availability in terms of volume in the natural forests, their properties and their levels of utilization.



DESCRIPTION OF PROPERTIES

APPEARANCE

Colour

Refers to the natural colour of the wood, which is developed due to the accumulation of extractives during heartwood formation.

Texture

Refers to the size and proportional amount of woody elements and this can be described in relation to pore sizes as fine, medium and coarse.

Lustre

Refers to the way in which light reflecting from the wood appears to penetrate into and then shine from the surface of the board. It is classified as dull, moderate and lustrous.

Fibre length

Refers to how straight and unbroken a single fibre is under microscope. It influences the strength properties wood and pulping characteristics, and is measured in mm.

Grain

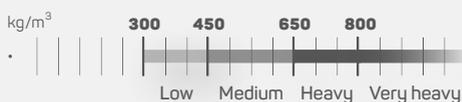
Indicates the orientation of the cells of the axial system or fiber direction as in "straight", "wavy", and "interlocked".

STRUCTURAL PROPERTIES

Refers to the qualities of wood that indicate its ability to resist applied external forces. They are an important criteria in determining the relative suitability of the different wood species for various uses.

Basic density

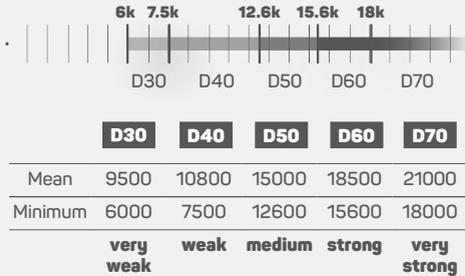
Refers to the weight or mass of wood divided by the volume of the specimen at a given moisture content. It is one of the most important physical properties of wood. The following scale shows the classification used in accordance with TIDD (2012) and Farmer (1972).



Classification	kg/m ³
Low	300 – 450
Medium	450 – 650
Heavy	650 – 800
Very Heavy	> 800

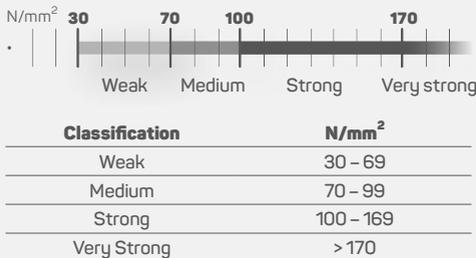
Modulus of Elasticity (MOE)

Refers to the resistance to deformation of wood during bending. It is the stiffness or the flexibility of wood when external forces are applied. These species are classified into five (5) strength groups or classes in accordance with BS 2568-2.



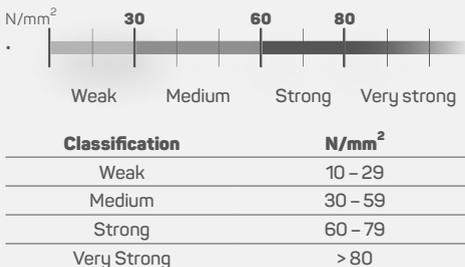
Modulus of Rupture (MOR)

Refers to the measure of the strength of wood before rupture during bending, also known as shear modulus. The hardwoods included here are classified as weak, medium, strong and very strong.



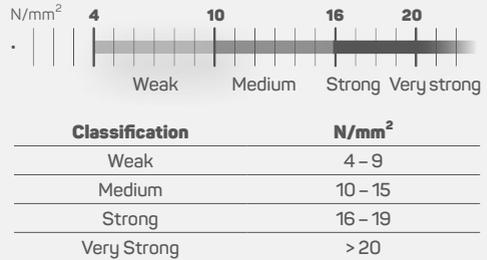
Compression parallel to the grain

Refers to the resistance to external forces acting longitudinally on a piece of wood.



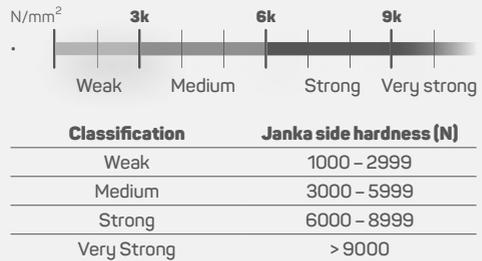
Shear parallel to the grain

Refers to the ability of a piece of wood to resist internal slipping of one part upon another along the grain when external forces act upon it in such a way that one portion tends to slide upon another adjacent to it.



Janka side hardness

Refers to the resistance to indentation and/or abrasion (surface scratching).



PERFORMANCE PROPERTIES

Durability

Refers to the ability of the wood species to resist the attacks of deteriorating organisms. Although wood is not completely immune to such attacks, some of the species possess superior resistance. The natural durability of the species are grouped according to ASTM D-2017 (2005), which is the decay resistance rating of the test specimens as indicated in the table below:



Average weight loss (%)	Decay resistance class
0 – 10	Highly resistant
11 – 24	Resistant
25 – 44	Moderately resistant
> 45	Susceptible

Treatability

Refers to the ease with which a species of wood takes in preservatives using vacuum or pressure processes. The classification is described in the table below:

Classification	Description
Permeable	Timber species of which preservatives can be penetrated completely under pressure without difficulty
Moderately resistant	Species which are fairly easy to treat and are possible for lateral penetration to be obtained or penetration of large proportion of the vessels is possible
Resistant	Species that are difficult to impregnate under pressure and require a long period of treatment
Extremely resistant	Species with the possibility of absorbing only a small quantity of preservative even under long pressure treatments. Preservatives are not able to penetrate to an appreciable depth laterally and longitudinally



Movement in service

Refers to the changes in the moisture content of the wood according to the environment that surrounds it. As humidity increases, the moisture content increases, and the wood swells causing expansion, while a decrease in humidity decreases the moisture content thereby causing the wood to shrink. Different species exhibit different rates of movement in wood due to differences in their shrinkage rates. Wood surfaces coated expand or contract at a slower rate than the surfaces of raw wood. Movement does not occur in all directions equally and movement across the grain is higher while very little is experienced along the length. Wood being a complex material has many variables that affect moisture content and wood movement. The movement is classified as small, medium and large.



WORKING QUALITIES

Sawmilling

Refers to the ease of sawing or operation of sawmill equipment and scheduling of materials to produce optimum quantity and quality of sawn timber. The classification of easy, medium and difficult consider a band sawing approach.

Machining

Refers to the process of cutting wood into desired shapes and dimension using very simple or complex woodworking equipment such as moulder, routers, lathes and sanders. Machining improves surface quality and aesthetic value of wood. It is classified as poor, satisfactory and good.

Blunting

Refers to the blunting effect of edges of cutters and saws with timber. It is classified as severe, moderately severe and slight. It is affected by the type of wood species, the presence of inclusions and varies within particular species.

Drying

Refers to the process of removing moisture in wood to a desired level through application of Kiln drying schedule to improve its serviceability. It is classified as slow, moderately rapid and rapid. The drying of wood is influenced by density and anatomical structures.

Gluing

Refers to the use of wood adhesives to bond the timber to another surface. The application and subsequent bonding can be classified as good, satisfactory and poor.

Finishing

Refers to operations involved in the application of transparent or opaque liquid coatings on the wood to protect and enhance its durability and appearance. It is classified as poor, satisfactory and good.

CLASSIFICATION OF WORKING QUALITIES

OPERATION	CLASSIFICATION		
	Easy	Medium	Difficult
Sawing	Easy	Medium	Difficult
Machining	Good	Satisfactory	Poor
Blunting	Slight	Moderate	Severe
Drying	Rapid	Moderate	Slow
Gluing	Good	Satisfactory	Poor
Finishing	Good	Satisfactory	Poor
Screw and nail holding	Good	Satisfactory	Poor



AFINA

Common names

Afina (Ghana)

Scientific name

Strombosia glaucescens (Engl):

Synonym - *Strombosia pustulata* Oliv.

Appearance

Colour: Brown or pale-brown with purple streaks (Heartwood); Pale brown (Sapwood).

Texture: Fine

Lustre: Moderate

Fibre length: Above 1.6 mm

Grain: Fairly straight

Structural properties

Basic Density kg/m^3
850 - 1,020 (very heavy)

Modulus of Elasticity (MOE) N/mm^2
16,370 - 20,190
D60

Modulus of Rupture (MOR) N/mm^2
170 - 243

Compression parallel to grain N/mm^2
58 - 90

Janka side hardness N/mm^2
5,300 - 7,900

Performance properties

Durability
moderately resistant

Treatability
extremely resistant

Moisture movement
large

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $300,000\text{m}^3$, for conversion into lumber, poles, and veneer.

Similarity with other species

Denya/Okan (*Cylicodiscus gabunensis*);

Apome/Ananta (*Cynometra ananta*);

Dialium Eyoum (*Dialium aubrevillei*);

Tali/Missanda (*Erythrophleum africanum*);

Ekki (*Lophira alata*);

Manilkara/Monghinza (*Manilkara obovata*);

African greenheart/Sougue (*Parinari excelsa*).

Working qualities

Sawing	—	—	—
Machining	—	—	—
Blunting	—	—	—
Drying	—	—	—
Gluing	—	—	—
Finishing	—	—	—
Screw and nail holding	—	—	—

End-uses



Heavy construction



Sleepers



Flooring



Turnery

AFRICAN GREENHEART

Common name

Afam (Ghana)

Scientific name

Parinari excelsa (Sabine)

Appearance

Colour: Pale red, chocolate-brown or greenish-grey (Heartwood); Yellowish-white (Sapwood).

Texture: Coarse

Lustre: Dull

Fibre length: 0.9 – 1.6 mm

Grain: Wavy to interlocked

Structural properties

Basic Density kg/m^3
730 – 920 (very heavy)

Modulus of Elasticity (MOE) N/mm^2
10,900 – 18,050
D50

Modulus of Rupture (MOR) N/mm^2
111 – 204

Compression parallel to grain N/mm^2
42 – 88

Shear parallel to grain N/mm^2
10 – 16

Janka side hardness N/mm^2
7,640 – 8,880

Performance properties

Durability
moderately resistant

Treatability
moderately resistant

Moisture movement
medium

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $52,100\text{m}^3$, for conversion into lumber, poles, veneer and plywood.

Similarity with other species

Afzelia/Papao/Doussie (*Afzelia africana*); Apome/Ananta (*Cynometra ananta*); Dialium Eyoum (*Dialium aubrevillei*); Tali/Missanda (*Erythrophleum africanum*); African apple/Bompagya (*Mammea africana*); Danta (*Nesogordonia papaverifera*); Essia (*Petersianthus macrocarpus*); Dahoma/Dabema (*Piptadeniastrum africanum*); Afena/Strombosia (*Strombosia glaucescens*).

Working qualities

Sawing	—	—	—
Machining	—	—	—
Blunting	—	—	—
Drying	—	—	—
Gluing	—	—	—
Finishing	—	—	—
Screw and nail holding	—	—	—

End-uses



Heavy construction



Flooring



Joinery



Steps and stairs



Trims and frames



Sleepers



Furniture



Turnery

AKEE

Common names

Akye fufuo (Ghana)

Scientific name

Blighia sapida (K.D. Koenig)

Appearance

Colour: Reddish-brown, brown-orange (Heartwood); White (Sapwood).

Texture: Medium

Lustre: Dull

Fibre length: 1.4 mm

Grain: Straight/slightly wavy

Structural properties

Basic Density kg/m^3

521 – 680 (medium)

Modulus of Elasticity (MOE) N/mm^2

12,190 – 22,650

D60

Modulus of Rupture (MOR) N/mm^2

86 – 159

Compression parallel to grain N/mm^2

30 – 62

Shear parallel to grain N/mm^2

16 – 22

Janka side hardness N/mm^2

3,100 – 23,000

Performance properties

Durability

moderately resistant

Treatability

permeable

Moisture movement

small

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $39,500\text{m}^3$, for conversion into lumber.

Similarity with other species

Other *Blighia* species (*B. unijugata*, and *B. welwitschii*);

Aningre / Asanfena (*Aningeria altissima*);

Celtis/Ohia (*Celtis adolfi-friderici*);

Celtis/Ohia (*Celtis mildbraedii*);

Chrysophyllum Longhi (*C. albidum*);

Akossika (*Scottellia klaineana*).

Working qualities

Sawing			
Machining			
Blunting			
Drying			
Gluing			
Finishing			
Screw and nail holding			

End-uses



Construction



Pallets and crates



Furniture



Turnery



Cabinet work



Handicrafts

APOME / ANANTA

Common names

Ananta (Ghana)

Scientific name

Cynometra Ananta (Hutch. & Dalziel)

Appearance

Colour: Dark red with darker streaks (Heartwood); Pink-brown (Sapwood).

Texture: Coarse

Fibre length: 0.9 – 2.0 mm

Grain: Straight to wavy

Structural properties

Basic Density kg/m^3
910 – 1,000 (very heavy)

Modulus of Elasticity (MOE) N/mm^2
14,700 – 17,840
D60

Modulus of Rupture (MOR) N/mm^2
126 – 187

Compression parallel to grain N/mm^2
72 – 83

Janka side hardness N/mm^2
11,700

Performance properties

Durability
highly resistant

Treatability
extremely resistant

Moisture movement
large

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $248,000\text{m}^3$, for conversion into lumber and poles.

Similarity with other species

Denya/Okan (*Cylicodiscus gabunensis*);

Dialium Eyoum (*Dialium aubrevillei*);

Tali/Missanda (*Erythrophleum africanum*);

Ekki (*Lophira alata*);

Manilkara/Monghinza (*Manilkara obovata*);

African greenheart/Afam/Sougue

(*Parinari excelsa*);

Dahoma/Dabema (*Piptadeniastrum africanum*);

Afena/Strombosia (*Strombosia glaucescens*).

Working qualities

Sawing	—	—	■
Machining	—	■	—
Blunting	—	—	■
Drying	—	—	■
Gluing	—	■	—
Finishing	—	■	—
Screw and nail holding	■	—	—

End-uses



Flooring



Heavy construction



Sleepers



Joinery



Turnery



Furniture

ALSTONIA

Common names

Sinuro/sinduro, Nyamedua (Ghana)

Scientific name

Alstonia boonei (De Wild)

Appearance

Colour: Yellowish-white (Heartwood and Sapwood)

Texture: Medium

Fibre length: 0.9 – 1.6 mm

Grain: Straight and sometimes wavy

Structural properties

Basic Density kg/m^3

360 – 420 (low)

Modulus of Elasticity (MOE) N/mm^2

5,790 – 10,500

D30

Modulus of Rupture (MOR) N/mm^2

48 – 73

Compression parallel to grain N/mm^2

23 – 37

Shear parallel to grain N/mm^2

6 – 7

Janka side hardness N/mm^2

1,820

Performance properties

Durability

susceptible

Treatability
permeable

Moisture movement
small

Availability

Annual round log production equivalent to the annual allowable cut is estimated at 178,900 m^3 , for conversion into lumber, veneer and plywood.

Similarity with other species

Chenchen/Ako/Antiaris (*Antiaris toxicaria*);

African canarium/Aiele (*C. schweinfurthii*);

Colawood/Watapuo (*Cola gigantea*);

Ogea (*Daniellia ogea*);

Sese/Holarrhena (*Holarrhena floribunda*);

Lannea/Kumanini/Kumbi (*L. welwitschii*);

Asoma/Essang (*Parkia bicolor*).

Working qualities

Sawing



Machining



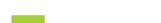
Blunting



Drying



Gluing



Finishing



Screw and nail holding



End-uses



Construction



Furniture



Cabinet work



Moulding



Joinery



Trims and frames



Pallets and crates



Handicrafts

AVODIRE

Common name

Apapaye (Ghana)

Scientific name

Turreanthus africanus (Welw.) Pellegr

Appearance

Colour: Creamy-white to pale-yellow, darkening to golden-yellow (Heartwood and Sapwood)

Texture: Fine

Lustre: Lustrous

Fibre length: 1.4 – 2.3 mm

Grain: Straight to interlocked

Structural properties

Basic Density kg/m^3

460 – 660 (medium)

Modulus of Elasticity (MOE) N/mm^2

8,300 – 12,100

D40

Modulus of Rupture (MOR) N/mm^2

83 – 166

Compression parallel to grain N/mm^2

36 – 61

Shear parallel to grain N/mm^2

9 – 19

Janka side hardness N/mm^2

4,800

Performance properties

Durability

susceptible

Treatability

permeable

Moisture movement

small

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $16,000\text{m}^3$, for conversion into lumber, veneer and plywood.

Similarity with other species

African canarium/Aiele (*Canarium schweinfurthii*); Gmelina (*Gmelina arborea*); Koto/African pterygota (*Pterygota macrocarpa*); Akossika (*Scottellia klaineana*); Sterculia yellow /Eyong/Ohaa (*Sterculia oblonga*).

Working qualities

Sawing	■	—	—
Machining	■	—	—
Blunting	■	—	—
Drying	—	■	—
Gluing	■	—	—
Finishing	■	—	—
Screw and nail holding	■	—	—

End-uses



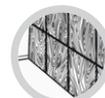
Furniture



Joinery



Cabinet work



Paneling

DANTA / KOTIBE

Common names

Danta, Epro, Akumaba (Ghana)

Scientific name

*Nesogordonia papaverifera (A. Chev.)
R. Capuron*

Appearance

Colour: Red-brown (Heartwood);
Pale red-brown (Sapwood).

Texture: Fine

Lustre: Dull

Fibre length: 0.8 – 1.3 mm

Grain: Straight

Structural properties

Basic Density kg/m^3

740 (heavy)

Modulus of Elasticity (MOE) N/mm^2

11,700

D50

Modulus of Rupture (MOR) N/mm^2

137

Compression parallel to grain N/mm^2

69.3

Sheer parallel to grain N/mm^2

12

Janka side hardness N/mm^2

8,204

Performance properties

Durability

highly resistant

Treatability

extremely resistant

Moisture movement

small

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $120,000\text{m}^3$, for conversion into lumber, veneer and plywood.

Similarity with other species

Utile/Sipo (*Entandrophragma utile*);

Scented Guarea/Bosse (*Guarea cedrata*);

African apple/Bompagya (*M. africana*);

Essia (*Petersianthus macrocarpus*);

Stercilia brown/Wawabima (*S. rhinopetala*);

Makore/Baku (*Tieghemella heckelii*).

Working qualities

Sawing



Machining



Blunting



Drying



Gluing



Finishing



Screw and nail holding



End-uses



Joinery



Turnery



Cabinet work



Flooring



Paneling



Furniture

DENYA / OKAN

Common names

Denya (Ghana)

Scientific name

Cylicodiscus gabunensis (Harms)

Appearance

Colour: Yellow brown to yellowish-red (Heartwood); Grayish-pink (Sapwood).

Texture: Coarse

Lustre: Lustrous

Fibre length: 1.1 – 1.9 mm

Grain: Interlocked

Structural properties

Basic Density kg/m^3 **770 – 1,100 (heavy)**

Modulus of Elasticity (MOE) N/mm^2 **14,700 – 22,600**
D70

Modulus of Rupture (MOR) N/mm^2 **129 – 230**

Compression parallel to grain N/mm^2 **64 – 108**

Shear parallel to grain N/mm^2 **8 – 22**

Janka side hardness N/mm^2 **10,600 – 12,800**

Performance properties

Durability **highly resistant**

Treatability **extremely resistant**

Moisture movement **medium**

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $500,000\text{m}^3$, for conversion into lumber and poles.

Similarity with other species

Apome/Ananta (*Cynometra ananta*);

Dialium Eyoum (*Dialium aubrevillei*);

Tali/Missanda (*Erythrophleum africanum*);

Ekki (*Lophira alata*);

Manilkara/Monghinza (*Manilkara obovata*);

African greenheart/Afam/Sougue (*Parinari excelsa*);

Dahoma/Dabema (*P. africanum*);

Afena/Strombosia (*Strombosia glaucescens*).

Working qualities

Sawing	—	—	■
Machining	■	—	—
Blunting	—	—	■
Drying	—	—	■
Gluing	■	—	—
Finishing	■	—	—
Screw and nail holding	■	—	—

End-uses



Heavy construction



Flooring



Furniture



Joinery



Steps and stairs



Sleepers

DIALIUM

Common names

Duabankye (Ghana)

Scientific name

Dialium aubrevillei (Pellegri)

Appearance

Colour: Pink-brown or almost black, brown-orange (Heartwood); Pale-pink brown (Sapwood).

Texture: Fine

Fibre length: 1.1 – 1.7 mm

Grain: Straight

Structural properties

Basic Density kg/m^3 900 – 1,050 a(very heavy)



Modulus of Elasticity (MOE) N/mm^2 20,600 – 25,500 D70



Modulus of Rupture (MOR) N/mm^2 165 – 203



Compression parallel to grain N/mm^2 96 – 128



Performance properties

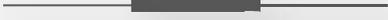
Durability
highly resistant



Treatability
extremely resistant



Moisture movement
medium



Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $51,900\text{m}^3$, for conversion into lumber, poles and posts.

Similarity with other species

Denya/Okan (*Cyclocodiscus gabunensis*);

Apome/Ananta (*Cynometra ananta*);

Tali/Missanda (*Erythrophleum africanum*);

Ekki (*Lophira alata*);

Manilkara/Monghinza (*Manilkara obovata*);

African greenheart/Afam/Sougue

(*Parinari excelsa*);

Afena/Strombosia (*Strombosia glaucescens*).

Working qualities

Sawing	—	—	—
Machining	—	—	—
Blunting	—	—	—
Drying	—	—	—
Gluing	—	—	—
Finishing	—	—	—
Screw and nail holding	—	—	—

End-uses



Heavy construction



Steps and stairs



Flooring



Sleepers

EFFEU

Common names

Hotro-Hotro, Fotie (Ghana)

Scientific name

Hannoa klaineana (Pierre)

Appearance

Colour: White or yellowish-white (Heartwood and Sapwood).

Texture: Coarse

Fibre length: 1.6 mm

Grain: Interlocked to straight

Structural properties

Basic Density kg/m^3

350 (low)

Modulus of Elasticity (MOE) N/mm^2

3,800 - 8,200

D30

Modulus of Rupture (MOR) N/mm^2

44 - 53

Performance properties

Durability

susceptible

Treatability

permeable

Moisture movement

medium

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $67,500\text{m}^3$, for conversion into lumber, billets, veneer and plywood.

Similarity with other species

Chenchen/Ako/Antiaris (*Antiaris toxicaria*);

African canarium/Aiele (*C. schweinfurthii*);

Colawood/Watapuo (*Cola gigantea*);

Ogea (*Daniellia ogea*);

Sese/Holarrhena (*Holarrhena floribunda*);

Asoma/Essang (*Parkia bicolor*).

Working qualities

Sawing	■	—	—
Machining	—	■	—
Blunting	■	—	—
Drying	■	—	—
Gluing	■	—	—
Finishing	■	—	—
Screw and nail holding	—	■	—

End-uses



Turnery



Trims and frames



Furniture



Cabinet work

ESSANG / ASOMA

Common names

Asoma (Ghana)

Scientific name

Parkia bicolor (A.Chev.)

Appearance

Colour: Brown, pale-brown (Heartwood); Yellowish (Sapwood).

Texture: Coarse

Lustre: Lustrous

Fibre length: 0.9 – 1.6 mm

Grain: Straight to interlocked

Structural properties

Basic Density kg/m^3

460 - 630 (medium)

Modulus of Elasticity (MOE) N/mm^2

9,500 - 11,600

D40

Modulus of Rupture (MOR) N/mm^2

35 - 126

Compression parallel to grain N/mm^2

34 - 44

Shear parallel to grain N/mm^2

6 - 7

Janka side hardness N/mm^2

2,470

Performance properties

Durability

susceptible

Treatability

moderately resistant

Moisture movement

medium

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at 191,250m³, for conversion into lumber, veneer and plywood.

Similarity with other species

Chenchen/Ako/Antiaris (*Antiaris toxicaria*); African canarium/Aiele (*C. schweinfurthii*); Colawood/Watapuo (*Cola gigantea*); Ogea (*Daniellia ogea*); Sese/Holarrhena (*Holarrhena floribunda*).

Working qualities

Sawing			
Machining			
Blunting			
Drying			
Gluing			
Finishing			
Screw and nail holding			

End-uses



Construction



Joinery



Trims and frames



Furniture



Cabinet work



Pallets and crates

KROMA / EVEUSS

Common names

Kroma, Kruma (Ghana)

Scientific name

Klainedoxa gabonensis (Pierre)

Appearance

Colour: Orange-yellow or golden-brown, darken to dark-brown (Heartwood and Sapwood).

Texture: Medium

Lustre: Dull

Fibre length: 1.6 – 2.0 mm

Grain: Straight to wavy

Structural properties

Basic Density kg/m^3
940 – 1,150 (very heavy)

Modulus of Elasticity (MOE) N/mm^2
15,970 – 21,280
D70

Modulus of Rupture (MOR) N/mm^2
167 – 250

Compression parallel to grain N/mm^2
83 – 104

Shear parallel to grain N/mm^2
14 – 18

Janka side hardness N/mm^2
7,700 – 18,200

Performance properties

Durability
highly resistant

Treatability
moderately resistant

Moisture movement
large

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $114,000\text{m}^3$, for conversion into lumber and poles.

Similarity with other species

Denga/Okan (*Cylicodiscus gabonensis*);

Apome/Ananta (*Cynometra ananta*);

Dialium Eyoum (*Dialium aubrevillei*);

Tali/Missanda (*Erythrophleum africanum*);

Ovengkol/Hyedua (*Guibourtia ehie*);

Ekki (*Lophira alata*);

Manilkara/Monghinza (*Manilkara obovata*);

Afena/Strombosia (*Strombosia glaucescens*).

Working qualities

Sawing	—	—	—
Machining	—	—	—
Blunting	—	—	—
Drying	—	—	—
Gluing	—	—	—
Finishing	—	—	—
Screw and nail holding	—	—	—

End-uses



Heavy construction



Flooring



Furniture



Joinery



Sleepers



Turnery

KUMBI

Common names

Kumanini (Ghana)

Scientific name

Lannea welwitschii (Hiern) Engl.

Appearance

Colour: Pink-gray to pale brown (Heartwood and Sapwood).

Texture: Medium

Lustre: Dull

Fibre length: 1.4 mm

Grain: Straight to interlocked

Structural properties

Basic Density kg/m^3

321 - 701 (medium)

Modulus of Elasticity (MOE) N/mm^2

8,356 - 12,540

D40

Modulus of Rupture (MOR) N/mm^2

46 - 91

Compression parallel to grain N/mm^2

11 - 30

Shear parallel to grain N/mm^2

6 - 10

Janka side hardness N/mm^2

2,450 - 7,370

Performance properties

Durability

susceptible

Treatability

moderately resistant

Moisture movement

medium

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at 21,200m³, for conversion into lumber, veneer and plywood.

Similarity with other species

Okoro/Nongo (*Albizia zygia*);
Chenchen/Ako/Antiaris (*Antiaris toxicaria*);
African canarium/Aiele (*C. schweinfurthii*);
Colawood/Watapuo (*Cola gigantea*);
Ogea (*Daniellia ogea*);
Edinam/Tiama/Gedu-Nohor (*E. angolense*);
Sapele/Sapelli (*E. cylindricum*);
Utile/Sipo (*Entandrophragma utile*);
Sese/Holarrhena (*Holarrhena floribunda*).

Working qualities

Sawing	—	—	—
Machining	—	—	—
Blunting	—	—	—
Drying	—	—	—
Gluing	—	—	—
Finishing	—	—	—
Screw and nail holding	—	—	—

End-uses



Joinery



Pallets and crates



Trims and frames



Paneling



Moulding

LATI / YAYA

Common names

Yaya (Ghana)

Scientific name

Amphimas pterocarpoides (Harms)

Appearance

Colour: Yellowish-brown (Heartwood);

Yellowish-white (Sapwood).

Texture: Coarse

Lustre: Dull

Fibre length: Unavailable

Grain: Straight to wavy

Structural properties

Basic Density kg/m^3

670 - 880 (heavy)

Modulus of Elasticity (MOE) N/mm^2

11,600 - 16,300

D50

Modulus of Rupture (MOR) N/mm^2

50 - 60

Compression parallel to grain N/mm^2

50 - 64

Shear parallel to grain N/mm^2

16

Janka side hardness N/mm^2

5,800

Performance properties

Durability

moderately resistant

Treatability

permeable

Moisture movement

medium

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $62,000\text{m}^3$, for conversion into lumber, veneer and plywood.

Similarity with other species

Ayan/Movingui (*Distemonanthus benthamianus*);

Ketele/Holoptelea (*Holoptelea grandis*);

Akossika (*Scottellia klaineana*);

Sterculia yellow/Eyong/Ohaa

(*Sterculia oblonga*).

Working qualities

Sawing



Machining



Blunting



Drying



Gluing



Finishing



Screw and nail holding



End-uses



Construction



Flooring



Joinery



Furniture



Trims and frames



Pallets and crates



Sleepers



Steps and stairs

NIANGON

Common names

Nyankom (Ghana)

Scientific name

Heritiera utilis (Sprague)

Appearance

Colour: Pink-brown (Heartwood);

Pale pink-brown (Sapwood).

Texture: Coarse

Fibre length: 0.5 – 2.1 mm

Grain: Straight to interlocked

Structural properties

Basic Density kg/m^3

625 – 700 (heavy)

Modulus of Elasticity (MOE) N/mm^2

9,120 – 14,400

D50

Modulus of Rupture (MOR) N/mm^2

74 – 171

Compression parallel to grain N/mm^2

38 – 62

Shear parallel to grain N/mm^2

4 – 13

Janka side hardness N/mm^2

3,740 – 4,890

Performance properties

Durability

moderately resistant

Treatability

extremely resistant

Moisture movement

medium

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $100,000\text{m}^3$, for conversion into lumber, veneer and plywood.

Similarity with other species

Edinam/Tiama/Gedu-Nohor

(*Entandrophragma angolense*);

Sapele/Sapelli (*E. cylindricum*);

Utile/Sipo (*Entandrophragma utile*);

Scented Guarea/Bosse (*Guarea cedrata*);

African apple/Bompagya (*M. africana*);

Danta (*Nesogordonia papaverifera*);

Stercilia brown/Wawabima (*S. rhinopetala*);

Makore/Baku (*Tieghemella heckelii*).

Working qualities

Sawing



Machining



Blunting



Drying



Gluing



Finishing



Screw and nail holding



End-uses



Construction



Joinery



Cabinet work



Trims and frames



Doors



Sleepers

OKORO / NONGO

Common names

Okoro, Okuro (Ghana)

Scientific name

Albizia zygia (DC.) J.F.Macbr.

Appearance

Colour: Light pinkish-brown, yellowish-brown (Heartwood); Yellowish-white (Sapwood).

Texture: Coarse

Lustre: Moderate

Fibre length: 1.1 – 1.4 mm

Grain: Straight to interlocked

Structural properties

Basic Density kg/m^3

500 – 720 (medium)

Modulus of Elasticity (MOE) N/mm^2

8,400 – 12,000

D40

Modulus of Rupture (MOR) N/mm^2

66 – 118

Compression parallel to grain N/mm^2

42 – 65

Shear parallel to grain N/mm^2

11 – 16

Janka side hardness N/mm^2

2,790 – 5,910

Performance properties

Durability

moderately resistant

Treatability

resistant

Moisture movement
small

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $2,047\text{m}^3$, for conversion into lumber, veneer and plywood.

Similarity with other species

Antrocaryon/Onzabili (*A. micraster*);

African canarium/Aiele (*C. schweinfurthii*);

Scented Guarea/Bosse (*Guarea cedrata*);

Niangon (*Heritiera utilis*);

African Walnut/Dibetou (*Lovoa trichilioides*);

Limba/Fraké/Ofram (*Terminalia superba*).

Working qualities

Sawing



Machining



Blunting



Drying



Gluing



Finishing



Screw and nail holding



End-uses



Construction



Flooring



Joinery



Turnery



Trims and frames



Pallets and crates



Steps and stairs



Cabinet works



Handicrafts



Furniture

RED OAK / KWATAFOMPABOA

Common names

Kwatafompaboa (Ghana)

Scientific name

Berlinia confusa (Hoyle)

Appearance

Colour: Reddish-brown (Heartwood); Whitish to grayish (Sapwood).

Texture: Coarse

Fibre length: 1.1 – 1.7 mm

Grain: Interlocked

Structural properties

Basic Density kg/m^3

610 – 720 (medium)

Modulus of Elasticity (MOE) N/mm^2

8,820

D30

Modulus of Rupture (MOR) N/mm^2

95 – 159

Compression parallel to grain N/mm^2

48 – 73

Sheer parallel to grain N/mm^2

8 – 12

Janka side hardness N/mm^2

6,310

Performance properties

Durability

moderately resistant

Treatability
permeable

Moisture movement
small

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at 60,000m³, for conversion into lumber, veneer and plywood.

Similarity with other species

Edinam/Tiama / Gedu-Nohor (*E. angolense*);
Sapele/Sapelli (*E. cylindricum*);
Utile/Sipo (*Entandrophragma utile*);
Scented Guarea/Bosse (*Guarea cedrata*);
African apple/Bompagya (*M. Africana*);
Danta (*Nesogordonia papaverifera*);
Stercilia brown/Wawabima (*S. rhinopetala*);
Makore/Baku (*Tieghemella heckelii*).

Working qualities

Sawing	■	—	—
Machining	■	—	—
Blunting	■	—	—
Drying	—	■	—
Gluing	—	■	—
Finishing	—	■	—
Screw and nail holding	■	—	—

End-uses



Construction



Flooring



Joinery



Furniture



Cabinet work



Steps and stairs



Turnery



Paneling

TETEKON

Common names

Tetekon (Ghana)

Scientific name

Gilbertiodendron limba (Scott-Elliot)

Appearance

Colour: dark or copper-brown (Heartwood); Graysih and yellowish (Sapwood).

Texture: Medium

Lustre: Moderate

Fibre length: 1.4 mm

Structural properties

Basic Density kg/m^3

492 – 694 (medium)

Modulus of Elasticity (MOE) N/mm^2

8,101 – 12,690

D40

Modulus of Rupture (MOR) N/mm^2

51 – 100

Compression parallel to grain N/mm^2

30 – 42

Sheer parallel to grain N/mm^2

12 – 14

Janka side hardness N/mm^2

4,400 – 10,970

Performance properties

Durability

resistant

Treatability

resistant

Moisture movement

medium

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $19,400\text{m}^3$, for conversion into lumber.

Similarity with other species

Antrocaryon/Onzabili (*A. micraster*);

Berlinia/Ebiara (*Berlinia confusa*);

African Walnut/Dibetou (*Lovoa trichilioides*);

Mansonia/Bété (*Mansonia altissima*);

Iroko/Odum (*Milicia excelsa*);

Sterculia brown/Wawabima (*S. rhinopetala*);

Emire/Idigbo / Framiré (*Terminalia ivorensis*);

Limba/Fraké / Ofram (*Terminalia superba*);

Makore/Baku (*Tieghemella heckelii*).

Working qualities

Sawing	<div style="width: 20px; height: 10px; background-color: #90EE90; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>
Machining	<div style="width: 20px; height: 10px; background-color: #90EE90; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>
Blunting	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #FFD700; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>
Drying	<div style="width: 20px; height: 10px; background-color: #90EE90; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>
Gluing	<div style="width: 20px; height: 10px; background-color: #90EE90; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>
Finishing	<div style="width: 20px; height: 10px; background-color: #90EE90; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>
Screw and nail holding	<div style="width: 20px; height: 10px; background-color: #90EE90; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>	<div style="width: 20px; height: 10px; background-color: #D3D3D3; display: inline-block;"></div>

End-uses



Construction



Flooring



Furniture



Joinery



Trims and frames



Steps and stairs

WATAPUO

Common names

Watapuo, Wobre, Dodowa (Ghana)

Scientific name

Cola gigantea (A.Chev)

Appearance

Colour: Grey-brown, brown-orange (Heartwood); Whitish-yellow (Sapwood).

Texture: Coarse

Lustre: Lustrous

Fibre length: 1.5 mm

Grain: Interlocked

Structural properties

Basic Density kg/m^3



Modulus of Elasticity (MOE) N/mm^2



Modulus of Rupture (MOR) N/mm^2



Performance properties

Durability



Treatability



Moisture movement



Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $65,400\text{m}^3$, for conversion into lumber.

Similarity with other species

Chenchen/Ako/Antiaris (*Antiaris toxicaria*); African canarium/Aiele (*C. schweinfurthii*); Ogea (*Daniellia ogea*); Sese/Holarrhena (*Holarrhena floribunda*); Lannea/Kumanini/Kumbi (*L. welwitschii*).

Working qualities

Sawing			
Machining			
Blunting			
Drying			
Gluing			
Finishing			
Screw and nail holding			

End-uses



Construction



Trims and frames



Moulding



Furniture



Cabinet work



Pallet and crates



Handicrafts

WAWABIMA/ BROWN STERCULIA

Common names *Wawabima* (Ghana)
Scientific name *Sterculia rhinopetala* (K. Schum)

Appearance

Colour: Dark red-brown (Heartwood); Pale red-brown (Sapwood).

Texture: Coarse

Fibre length: 1.5 – 2.0 mm

Grain: Straight to slightly interlocked

Structural properties

Basic Density kg/m^3
720 – 890 (very heavy)

Modulus of Elasticity (MOE) N/mm^2
13,400 – 18,700
D60

Modulus of Rupture (MOR) N/mm^2
116 – 186

Compression parallel to grain N/mm^2
57 – 81

Shear parallel to grain N/mm^2
14 – 15

Janka side hardness N/mm^2
6,180 – 8,050

Performance properties

Durability
moderately resistant

Treatability
permeable

Moisture movement
medium

Availability

Log production is from sustainably managed production natural forest based on the Ghana forest management standards. Annual round log production equivalent to the annual allowable cut is estimated at $170,000\text{m}^3$, for conversion into lumber, veneer and plywood.

Similarity with other species

Utile/Sipo (*Entandrophragma utile*);
Scented Guarea/Bosse (*Guarea cedrata*);
African apple/Bompagya (*M. africana*);
Danta (*Nesogordonia papaverifera*);
Essia (*Petersianthus macrocarpus*).

Working qualities

Sawing			
Machining			
Blunting			
Drying			
Gluing			
Finishing			
Screw and nail holding			

End-uses



Construction



Flooring



Joinery



Furniture



Turnery



Trims and frames

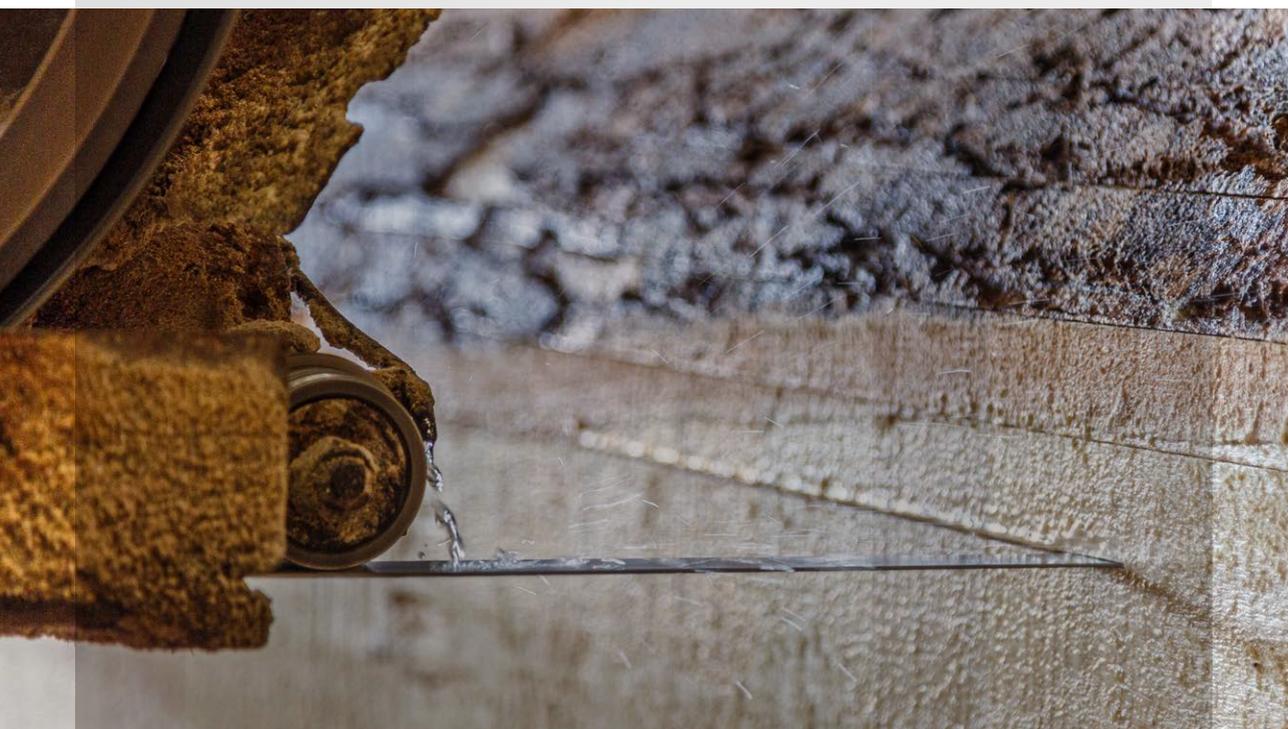


Doors

APPENDIX: SUMMARY OF THE NAMES OF THE TWENTY SELECTED TIMBER SPECIES

Trade name	Common/Local names	Scientific name
Afina	Afena (Ghana), Poe (Cote d'Ivoire); Others: Mukundu, Efenka, Omenam	<i>Strombosia glaucescens</i>
Akee	Akye fufuo (Ghana); Akee (Cote d'Ivoire); Others: Tsana	<i>Blighia sapida</i>
African Greenheart	Afam (Ghana); Piolo, Sougue (Cote d'Ivoire); Others: Mbura, Ofam, Pembe	<i>Parinari excelsa</i>
Apome / Ananta	Ananta (Ghana); Apome (Cote d'Ivoire); Others: Wonyae	<i>Cynometra ananta</i>
Alstonia	Sinuro/sinduro, Nyamedua (Ghana); Emien (Cote d'Ivoire); Ekouk (Cameroon); Others: Stoolwood, Patternwood	<i>Alstonia boonei</i>
Avodire	Apapaye (Ghana); Avodire (Cote d'Ivoire); Others: Apaya, Engan, Lusamba, wansenwa	<i>Turraeanthus africanus</i>
Danta / Kotibe	Danta, Epro, Akumaba (Ghana); Kotibe (Cote d'Ivoire); Ovoui, Owoe (Cameroon); Others: Aborbora, kondofindo	<i>Nesogordonia papaverifera</i>
Denya / Okan	Denya (Ghana); Bouemon (Cote d'Ivoire); Okan, Aduom (Cameroon); Others: Edum	<i>Cylicodiscus gabunensis</i>
Dialium	Duabankye (Ghana); Kofina, Afanbeou (Cote d'Ivoire); Mfang (Cameroon); Others: Kasusu, Omvong, Bongola, Pau veludo, Gbelle-flu, Gia kaba, Ziba	<i>Dialium aubrevillei</i>
Effeu	Hotro-Hotro, Fotie (Ghana) Effeu (Côte d'Ivoire); Nomozek (Cameroon); Others: Hotoro	<i>Hannoa klaineana</i>
Essang / Asoma	Asoma (Ghana); Lo (Cote d'Ivoire); Essang (Cameroon); Others: Asona, Dawadua, Osoma, Saoma, Locust bean	<i>Parkia bicolor</i>

Trade name	Common/Local names	Scientific name
Kroma / Eveuss	Kroma, Kruma (Ghana, Cote d'Ivoire); Others: Eveuss, Eves, Ududu	<i>Klainedoxa gabonensis</i>
Kumbi	Kumanini (Ghana); Loloti (Cote d'Ivoire); Ekoa (Cameroon); Others: Not available	<i>Lannea welwitschii</i>
Lati / Yaya	Yaya (Ghana); Lati (Cote d'Ivoire); Edjin-Edzil (Cameroon); Others: Asanfran, Bokanga, Edzui, Muizi, Va Tue	<i>Amphimas pterocarpoides</i>
Okoro / Nongo / Red Nongo	Okoro, Okuro (Ghana); Bangbaye (Cote d'Ivoire); Saliémo (Cameroon); Others: Omulera, Kassa-kassa, Ohura, Red nongo	<i>Albizia zygia</i>
Red Oak / Kwatafompaboa	Kwatafompaboa (Ghana); Others: Abem, Ebiara, Melegba, Pocouli, Samata/Samanta	<i>Berlinia confusa</i>
Niangon	Nyankom (Ghana); Niangon (Cote d'Ivoire); Others: Anguekong, Ogoue, Kwaeduma, Wishmore	<i>Heretiera utilis</i>
Tetekon	Tetekon (Ghana); Vaa (Cote d'Ivoire); Others: Agyamera, Bembe, Ekobem, Epal, Ligudu, Molapa, Sehmehe, Mbombi	<i>Gilbertiodendro limba</i>
Watapuo	Watapuo, Wobre, Dodowa (Ghana); Ouara (Cote d'Ivoire); Others: Not available	<i>Cola gigantea</i>
Wawabima / Brown Sterculia	Wawabima (Ghana); Lotofa (Cameroon); Others: Awasea, N'kwanang	<i>Sterculia rhinopetala</i>





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 /bvrio

 /canalbvrio

 /timberbvrio

LESSER-KNOWN & LESSER-USED TIMBER SPECIES

UTILISING GHANA'S SUSTAINABLE
TIMBER RESOURCES

 BVRIO

 **AFC**
Forestry Commission

