**Appendix S1. Definition and unit of wood physical and mechanical properties.**

| Notation | Definition | Unit |
|---|---|---|
| $w$ | water content or moisture $w = 100(m_w - m_0)/m_0$ | % of the dry mass |
| $S$ | fiber saturation point (water content above which the wood volume does not increase) | % |
| $m_w$ | mass at moisture $= w$ | g |
| $m_0$ | anhydrous mass or "oven dry mass" | g |
| $V_w$ | volume at moisture $= w$ | $cm^3$ |
| $V_0$ | anhydrous volume | $cm^3$ |
| $V_S$ | volume at $w = S$ or "green volume" | $cm^3$ |
| $R$ | volumetric shrinkage coefficient (variation in volume per 1% change in water content) $R = 100(V_S - V_0)/(V_S S)$ | %/% |
| $D_b$ | basic wood density ($m_0/V_S$) or "wood specific gravity" | $g/cm^3$ |
| $D_{12}$ | wood density at 12% moisture ($m_{12}/V_{12}$) | $g/cm^3$ |
| $D_{15}$ | wood density at 15% moisture ($m_{15}/V_{15}$) | $g/cm^3$ |
| $D_0$ | anhydrous wood density ($m_0/V_0$) | $g/cm^3$ |

## Appendix S2. Correcting Sallenave's formula

### Step 1: Computing the anhydrous mass $m_0$

Using $d$ the density conversion factor per 1% change in moisture content defined by Sallenave (1955), we compute $D_0$, the anhydrous density: $D_0 = D_{12} - 12d$. Because $D_0 = m_0/V_0$, we obtain $m_0 = V_0(D_{12} - 12d)$ (Eq. A1).

### Step 2: Computing the saturated volume $V_\mathrm{S}$

Sallenave (1955) defined $\nu$ as the volumetric shrinkage coefficient (in %/%) using $V_0$ as the reference volume: $\nu = 100(V_\mathrm{S} - V_{12})/(V_0(S - 12))$. We use this definition to derive $V_\mathrm{S} = V_{12}(1 + (\nu/100)(S - 12))$ (Eq. A2)

### Step 3: Computing the basic wood density $D_\mathrm{b}$

Basic wood density $D_\mathrm{b}$ is defined as $D_\mathrm{b} = m_0/V_\mathrm{S}$. Using Eq. A1 and Eq. A2, $D_\mathrm{b}$ can be written $D_\mathrm{b} = (V_0/V_{12})(D_{12} - 12d)/[1 + (\nu/100)(S - 12)]$. This demonstrates that Sallenave's formula is true only if $V_0 = V_{12}$.

## Literature cited

Sallenave, P. 1955. Propriétés physiques et mécaniques des bois tropicaux de l'Union française. Centre technique forestier tropical, Nogent-sur-Marne, France. Available at: https://doi.org/10.18167/agritrop/00359.

**Appendix S3. Analysis of variance results.** *This table presents the results of three analysis of variance testing the difference between groups of trees for the value of the conversion factor. We tested the difference between (i) angiosperm and gymnosperm trees, (ii) tropical and temperate trees, and (iii) high wood density and low wood density angiosperm trees. We considered that a tree has a high wood density if* $D_{12} \geq 0.5$ *g/cm*[3] *and a low wood density if* $D_{12} < 0.5$ *g/cm*[3]*.* $n$ *indicates the number of trees in each group,* $d$ *indicates the difference between groups' conversion factor values,* $F$ *indicates the value of the* $F$*-test (between group variability/within group variability), and p-value is the probability value of the null hypothesis (assuming no difference between groups).*

| Groups | $n$ | conversion factor | $d$ | F | $p$-value |
|---|---|---|---|---|---|
| Angiosperms | 3631 | 0.828 | 0.01 | 17 | <0.001 |
| Gymnosperms | 201 | 0.838 | | | |
| | | | | | |
| Tropical trees | 3700 | 0.828 | <0.01 | 5 | <0.05 |
| Temperate trees | 132 | 0.824 | | | |
| | | | | | |
| High $D_{12}$ angiosperm trees | 3238 | 0.828 | 0.01 | 36 | <0.001 |
| Low $D_{12}$ angiosperm trees | 393 | 0.838 | | | |

Given the large number of samples in the groups, the difference bewteen groups' conversion factor values were significant at the 95% probability threshold ($p$-value $< 0.05$) for the three tests. But the magnitude of the differences was lower or equal to 0.01, and of the same order as the uncertainty on $D_{12}$, which is of about 0.01 g/cm$^3$. So we considered these differences between groups not meaningful.