Supporting Information

Sterck et al. 10.1073/pnas.1106950108

SI Text S1

Model Description. *SI Text S1* provides the mathematical description of the plant model (partially adapted from ref. 1). For parameterization of the model, see *SI Text S2* and Table S1; for the calculated variables by the model, see Table S2; for the measured functional trait values, see Table S3 (model version) and Table S4 (field estimates); for estimations of light and water niches of species, see *SI Text S3*.

The model plant is defined by a shoot system (Fig. S1). The crown has a cylindrical shape, with a given top height h_t (m), crown bottom height h_b (m), and crown radius r (m), and uniform distributions were assumed for the leaf area density λ_l (leaf area per crown volume, $m^2 \cdot m^{-3}$) and sapwood area density λ_s. The λ_s can be interpreted as the sapwood area connected to leaves (or in the petioles) per crown volume ($m^2 \cdot m^{-3}$). We defined only the sapwood area density and not heartwood area density, because heartwood has no maintenance costs and does not transport water, and mechanical constraints were not considered. The photosynthetic capacity of the leaves was characterized by an average nitrogen mass per leaf mass, N_{mass} ($kg \cdot kg^{-1}$), and leaf mass per unit leaf area (LMA) ($kg \cdot m^{-2}$).

Biomass. The vegetative plant mass M is the sum of structural leaf mass M_w, photosynthetic protein leaf mass M_n, and the sapwood wood mass M_s (all in kilograms),

$$M = M_w + M_n + M_s \quad [S1]$$

with

$$M_w = \rho_w A_l \quad [S2]$$

$$M_n = \rho_n N_{mass} \mathrm{LMA} \cdot A_l \quad [S3]$$

$$M_s = \rho_s A_s L_s. \quad [S4]$$

Here ρ_w is the structural leaf mass per leaf area ($kg \cdot m^{-2}$), ρ_n is the photosynthetic protein mass per nitrogen mass ($kg \cdot kg^{-1}$), ρ_s is the sapwood wood mass per sapwood volume ($kg \cdot m^{-3}$), A_l is the total leaf area (m^2), A_s is the stem sapwood area below the crown (no tapering) (m^2), and L_s is the average sapwood length between the stem base and leaves (m). A_l and A_s are calculated from

$$A_l = \lambda_l V_c \quad [S5]$$

$$A_s = \lambda_s V_c \quad [S6]$$

with crown volume V_c (m^3) calculated as

$$V_c = \pi r^2 (h_t - h_b). \quad [S7]$$

Given the assumed uniform distribution of leaves and sapwood within the crown volume, L_s (m) is calculated as

$$L_s = 1/2 (h_t + h_b) + 2/3 r. \quad [S8]$$

We thus see that L_s is defined by a vertical length (left term) and a horizontal length (right term). Moreover, L_s defines a focal point in the crown (Fig. S1), for which the effective crown water potential ψ_l (MPa) and the effective internal crown CO_2 pressure across all leaves c_i (Pa) are calculated.

Carbon gain rate. In this study, net photosynthesis or carbon gain rate of plants P_n ($kg\ C \cdot d^{-1}$) is calculated as

$$P_n = P_g - R_m. \quad [S9]$$

The maintenance respiration rate R_m ($kg\ C \cdot d^{-1}$) equals the sum of the respiration rate in the leaves and sapwood,

$$R_m = r_w M_w + r_n M_n + r_s M_s. \quad [S10]$$

Here r_w and r_s are the parameters for mass-based maintenance respiration rates of the structural leaf mass and the sapwood ($kg\ C \cdot kg^{-1} \cdot d^{-1}$), and r_n is the respiration rate per photosynthetic leaf protein mass ($kg\ C \cdot kg^{-1}(proteins) \cdot d^{-1}$).

The gross photosynthesis of the plant P_g ($kg\ C \cdot d^{-1}$) is calculated from

$$P_g = 43,200 \cdot 12 \cdot 10^{-9} \cdot P_g. \quad [S11]$$

Here P_g is the gross photosynthetic rate of the plant ($\mu mol\ C \cdot s^{-1}$), and the number provides the conversion from ($\mu mol\ C \cdot s^{-1}$) to ($kg\ C \cdot d^{-1}$) when accounting for 12 sunlight hours per day. P_g is calculated from a biochemical photosynthesis model (2) and formulated as a big leaf model. The gross photosynthesis is described as the minimum of two dependent processes, i.e., carboxylation or rubisco limited photosynthesis rate and electron transport limited photosynthesis rate. Here, the carboxylation limited photosynthetic rate P_c and electron transport limited photosynthetic rate P_j ($\mu mol\ C \cdot s^{-1}$) can be written as

$$P_c = V_{cmax} \left\{ \frac{c_i - \Gamma}{c_i + K_{cmm}\left(1 + o/K_{omm}\right)} \right\} \quad [S12]$$

$$P_j = J_{max} \varphi_j(\xi) \left\{ \frac{c_i - \Gamma}{c_i + 2\Gamma} \right\}, \quad [S13]$$

where V_{cmax} ($\mu mol\ C \cdot s^{-1}$) is the maximum rate of carboxylation of the plant, J_{max} ($\mu mol^{els} \cdot s^{-1}$) is the maximum electron transport rate limited photosynthesis, c_i is the effective crown CO_2 pressure across leaves at the focal point (Pa), Γ is a parameter for the CO_2 compensation point (Pa), K_{cmm} (Pa) and K_{omm} (Pa) are the Michaelis–Menten constants for carboxylation and oxygenation, respectively, o is the crown oxygen pressure (Pa) set to the atmospheric O_2 pressure, and $\varphi(\xi)$ is a term for the light limitation effects. V_{cmax} ($\mu mol\ C \cdot s^{-1}$) and J_{max} can be written as

$$V_{cmax} = k_c (1 - \upsilon_{chl})(1 - \upsilon_j) N_{mass} \mathrm{LMA} \cdot \mathrm{LAI} \cdot A_c \quad [S14]$$

$$J_{max} = \frac{k_j}{4} \left(1 - \upsilon_{chl}\right) \upsilon_j N_{mass} \mathrm{LMA} \cdot \mathrm{LAI} \cdot A_c. \quad [S15]$$

Here the parameter k_c is the carboxylation capacity per nitrogen mass ($\mu mol\ C \cdot kg^{-1}\ N \cdot s^{-1}$), k_j is the electron transport capacity per nitrogen mass ($\mu mol\ C \cdot kg^{-1}\ N \cdot s^{-1}$), υ_{chl} is a fixed nitrogen fraction distributed to chloroplasts, and υ_j is the nitrogen fraction partitioned to electron transport. It is assumed that υ_j and the nitrogen fraction partitioned to carboxylation υ_c sum to unity ($\upsilon_j + \upsilon_c = 1$). We thus assumed that all nitrogen is deployed for photosynthesis.

The $\varphi(\xi)$ term in Eq. **S13** is a dimensionless function that specifies the light limitation effects on the electron transport limited photosynthesis. Such a function has been formulated for leaves, but under the assumption that ψ_l and c_i are defined at the focal point (Fig. S1), the function can be up-scaled to the crown. The function $\varphi(\xi)$ varies between 0 and 1, increases linearly from 0 at low values of ξ, and approaches 1 asymptotically at high ξ-values,

$$\varphi(\xi) = \frac{(1+\xi) - \sqrt{(1+\xi)^2 - 4\theta_j\xi}}{2\theta_j}, \qquad \textbf{[S16]}$$

with θ_j the curvature factor for the nonrectangular hyperbola and ξ is the ratio of the light absorption rate over the capacity for the electron transport (dimensionless), defined as

$$\xi = \frac{qI_a}{k_j(1-\upsilon_{chl})\upsilon_j \cdot N_{mass} \cdot \mathrm{LMA} \cdot \mathrm{LAI}}, \qquad \textbf{[S17]}$$

where q is the quantum yield (μmol electrons·μmol photons^{-1}) and I_a is the absorbed light per unit ground area (μmol photons·m^{-2}·s^{-1}) calculated as

$$I_a = I(1 - \mathrm{Exp}[-K_l\mathrm{LAI}]). \qquad \textbf{[S18]}$$

Here I is the vertical light intensity on top of the crown (μmol photons·m^{-2}·s^{-1}), and K_l is the light extinction coefficient (dimensionless) for leaves.

We can formulate c_i as a function of the effective crown water potential ψ_l in the focal point. We assumed steady state for the CO_2 influx and the CO_2 consumption by the crown,

$$G_s\frac{(c_a - c_i)}{p_a} = P_n. \qquad \textbf{[S19]}$$

Here G_s is the stomatal conductance of the plant (μmol C·s^{-1}), P_n is the net crown photosynthesis rate of the plant (μmol C·s^{-1}), c_a is atmospheric CO_2 pressure (Pa), and p_a is the atmospheric pressure set at 1×10^5 Pa. G_s is modeled by scaling of a function for leaf stomatal conductance (3) to the whole crown,

$$G_s = G_{s0} + a\frac{P_n}{c_i - \Gamma}g_\psi. \qquad \textbf{[S20]}$$

Here G_{s0} is the residual stomatal conductance of the plant (μmol C·s^{-1}) and the parameter a is a scaling parameter set to the value $2p_a$. A logistic equation describes a dimensionless stomatal sensitivity g_ψ to ψ_l (3),

$$g_\psi(\psi_l) = \frac{1 + e^{a_\psi \times \psi_{ref}}}{1 + e^{a_\psi \times (\psi_{ref} - \psi_l)}}, \qquad \textbf{[S21]}$$

which for the given parameter values a_ψ and ψ_{ref} varies from 0 ($\psi_l << \psi_{ref}$) to 1 (at $\psi_l = 0$ MPa). Because we assumed that $G_{s0} = 0$, P_n cancels from the CO_2 balance equation (Eq. **S20**), and the calculation of c_i is simplified to an equation of ψ_l and a number of parameters,

$$c_i(\psi_l) = \frac{(a/p_a)g_\psi(\psi_l)c_a + \Gamma}{(a/p_a)g_\psi(\psi_l) + 1}. \qquad \textbf{[S22]}$$

Water flow. Steady state is assumed for the plant transpiration E and the plant water transport through the sapwood F. Although not realistic at a timescale of minutes to hours (4, 5), such a steady state is a reasonable assumption for tree life and size patterns in the daily time-step model used here. Using Eq. **S20** to define the conductance for water, we can write this steady-state assumption for the transpiration and stem water flow, i.e., $E - F = 0$,

$$\gamma_{wc}a\frac{P_n(\psi_l)}{c_i(\psi_l) - \Gamma}g_\psi(\psi_l)D - \left(\psi_b - \psi_g - \psi_l\right)\frac{K_sA_s}{L_s} = 0. \qquad \textbf{[S23]}$$

For the left term, γ_{wc} is the ratio of water diffusivity over carbon dioxide diffusivity (~1.6) and D is the vapor pressure difference between leaf and air. The right term is the product of the pressure difference between stem base and focal point in the crown and the average sapwood conductance between the stem base and that focal point (Fig. S1). The presssure difference is based on the stem base pressure ψ_b, crown potential pressure ψ_l, and the presssure loss due to gravity ψ_g. Sapwood conductance is written as the product of the specific conductivity of sapwood K_s, the sapwood area A_s divided by the sapwood length L_s between stem base and focal point (Fig. S1).

Both steady-state assumptions [$P_c = P_j$, Eqs. **S12** and **S13** (see also Eqs. **S14** and **S15**), and $E = F$, Eq. **S23**] will be parameterized for all traits, except for the crown water potential ψ_l and the optimal nitrogen partitioning, which is expressed by the nitrogen fraction allocated to electron transport υ_j. The two steady-state equations are solved for ψ_l and υ_j, and the solution for ψ_l also provides the crown CO_2 pressure c_i (Eq. **S22**).

SI Text S2

Model Parameterization. The sources and values used for the parameterization are provided in Table S1. Below, we shortly explain this parameterization.

Environmental conditions. We considered averaged diurnal environmental conditions, because this allows us to evaluate carbon gain rate patterns in a most simplified way. Atmospheric conditions were fixed; i.e., air temperature T = 25 °C, air CO_2 pressure c_a = 30 Pa, atmospheric air pressure p_a = 100,000 Pa, and air vapor pressure deficit D = 950 Pa, which corresponds to a relative humidity of 70% at 25 °C. In the simulations, we evaluated the consequences of light availability by varying the external vertical light intensity I from 0 to 1,500 μmol·m^{-2}·s^{-1} and of soil water availability by varying the soil water potential at the stem base ψ_b from −8 to 0 Pa.

Physiological parameters: photosynthesis. For T = 25 °C, most photosynthetic parameters are relatively stable across C3 plants (6). We estimated the carboxylation capacity per unit nitrogen k_c = 83,000 μmol·(kg N)$^{-1}$·s^{-1} and the electron transport capacity per unit nitrogen k_j = 1,050,000 μmol·(kg N)$^{-1}$·s^{-1} (7), the Michaelis–Menten constant for carboxylation K_{cmm} = 40.4 Pa and for oxygenation K_{omm} = 24,800 Pa, the oxygen concentration in the leaf o = 21,000 Pa, the quantum yield q = 0.25 (μmol electrons)·(μmol photon^{-1}), the ratio for H_2O/CO_2 diffusivity γ_{wc} = 1.6, and the curvature factor for the electron transport rate process θ_j = 0.5. Other rather stable parameter values included the fraction of incident light absorbed by a leaf, K_l = 0.86; the protein mass per unit photosynthetic nitrogen mass ρ_n = 5.88 was estimated.

Physiological parameters: respiration. Mass-based respiration rate parameters were estimated. The respiration rate of the plant is calculated from mass-based respiration rates for leaves and sapwood. The reported estimates for the sapwood mass-based respiration rate vary a lot in the literature (e.g., ref. 8 for saplings) and are prone to error (9). For comparative purposes, we gave the species the same sapwood mass-based respiration rate r_s = 0.4 μmol C·kg^{-1} sapwood·s^{-1}. For leaves, the structural leaf maintenance respiration rate r_w was set at 4 μmol C·kg^{-1} leaf·s^{-1} for all species. For photosynthetic respiration rate, a maintenance respiration rate *per unit protein* r_n = 1,000 μmol C·kg^{-1} (protein)·s^{-1} was assumed.

Functional trait variation across species. We used species-specific measurements to estimate various functional trait values (Tables

S3 and S4). We set the sapling height h_t, crown bottom height h_b, crown radius r, leaf area index (LAI) (total leaf area per crown area), and stem sapwood area A_s for each species, on the basis of averaged values across 10 individuals per species. We also set LMA, nitrogen mass per leaf mass N_{mass}, and specific hydraulic conductivity K_s on the basis of measured values of the same individuals (10). For stomatal sensitivity, we used minimum leaf water potentials ψ_{min} as entrances for ψ_{ref}, i.e., the leaf water potential at which plants lost half of their stomatal conductance capacity. The sapwood mass density ρ_s was also measured for each species (as sapwood density) (10).

SI Text S3

Species Estimates for Actual Water and Light Niches in the Forest. Simulated carbon gain patterns along potential light and water gradients were compared with the average light and water conditions encountered by 2-m tall saplings of the studied species. Our light index quantifies the light conditions from an independent, objective, and continuous measure of crown exposure This exposure measure was estimated for each species in relation to the height of ~1,253 (range: 48–9,064) trees per studied species (11), on the basis of an inventory of these and other species in 80 ha of forest. This forest is the same area where we sampled our saplings for functional traits. Crown exposure was scored as 1 if the tree does not receive any direct light, 2 if it receives lateral light, 3 if it receives overhead light on 10–90% of the crown, 4 if it receives full overhead light on >90% of the crown, and 5 if it has an emergent crown (12). Crown exposure was measured repeatedly (mean difference between two independent observers is 0.1 ± 0.01 SE), and the relation between the crown exposure and both canopy openness and incident radiation was good (13). Crown exposure was related to tree height using a multinomial regression analysis (14). The population average of crown exposure at a tree height of 2 m was used as the light index in our study.

Our water index quantified the water availability for each species, using an inventory of these species in the forest (12). In this inventory, a total of sixty 10 × 10-m plots were established along topographical gradients in 80 ha of forest area (the same forest area as used for the crown exposure measures, i.e., the light index). On the basis of the inventory, 20 plots were established in bottom, slope, and crest conditions, respectively. These topographic positions are good indicators of soil water availability in the studied forest, as well as in other tropical forests. Potential plot locations of each topographic location were randomly selected in the landscape with the help of elevation maps, and the suitability was verified in the field. Individual plots were located at least 50 m from each other. All trees and shrubs >30 cm tall were measured and identified to species. On average, a sample of 78 individuals (range 12–401) were scored per study species (10). We used the abundance (counts) of each of the 13 study species in the valley, slope, and crest plots to calculate the water index. We first calculated the relative frequencies (values between 0 and 1) per species for each topographic category, which sum to 1. We multiplied these relative frequencies by 1 for crest, 2 for slope, and 3 for valley to weight them for water availability and, in turn, took the means of these adjusted frequencies. We thus obtained a water index running from 0.33 to 1.0, which acts as a proxy of increasing water availability from crest, to slope, to valley. The validity of this index is supported because these topographic categories create a major source of variation in the soil water potential of the studied forest (15), as well as in other tropical forests (e.g., ref. 16).

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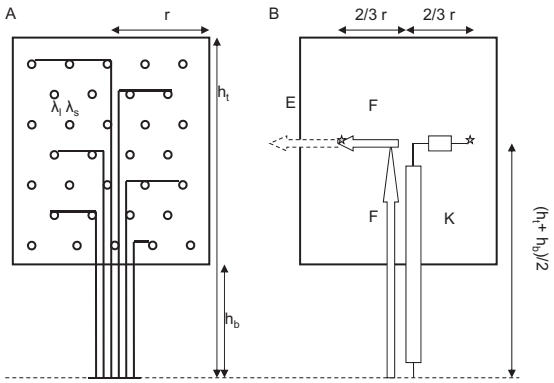

Fig. S1. Illustrations of the plant structure and water flow system. (*A*) The vegetative plant status elements visualized: plant height h_t (m), crown bottom height h_b (m), crown radius r (m), leaf area density or leaf area per crown volume λ_l ($m^2 \cdot m^{-3}$), and sapwood area density or sapwood cross-section area (connected to leaves, i.e., in petioles) per crown volume λ_s ($m^2 \cdot m^{-3}$). (*B*) The water fluxes in a plant, driven by a water potential gradient and resistances along the flow path. *F* stands for the water flux in the sapwood and *E* for the transpiration by the whole crown. The fluxes are calculated from the stem base to the focal point in the crown (star) (*SI Text S1*). *K* stands for the conductance of the sapwood between stem base and focal point (adapted from ref. 1).

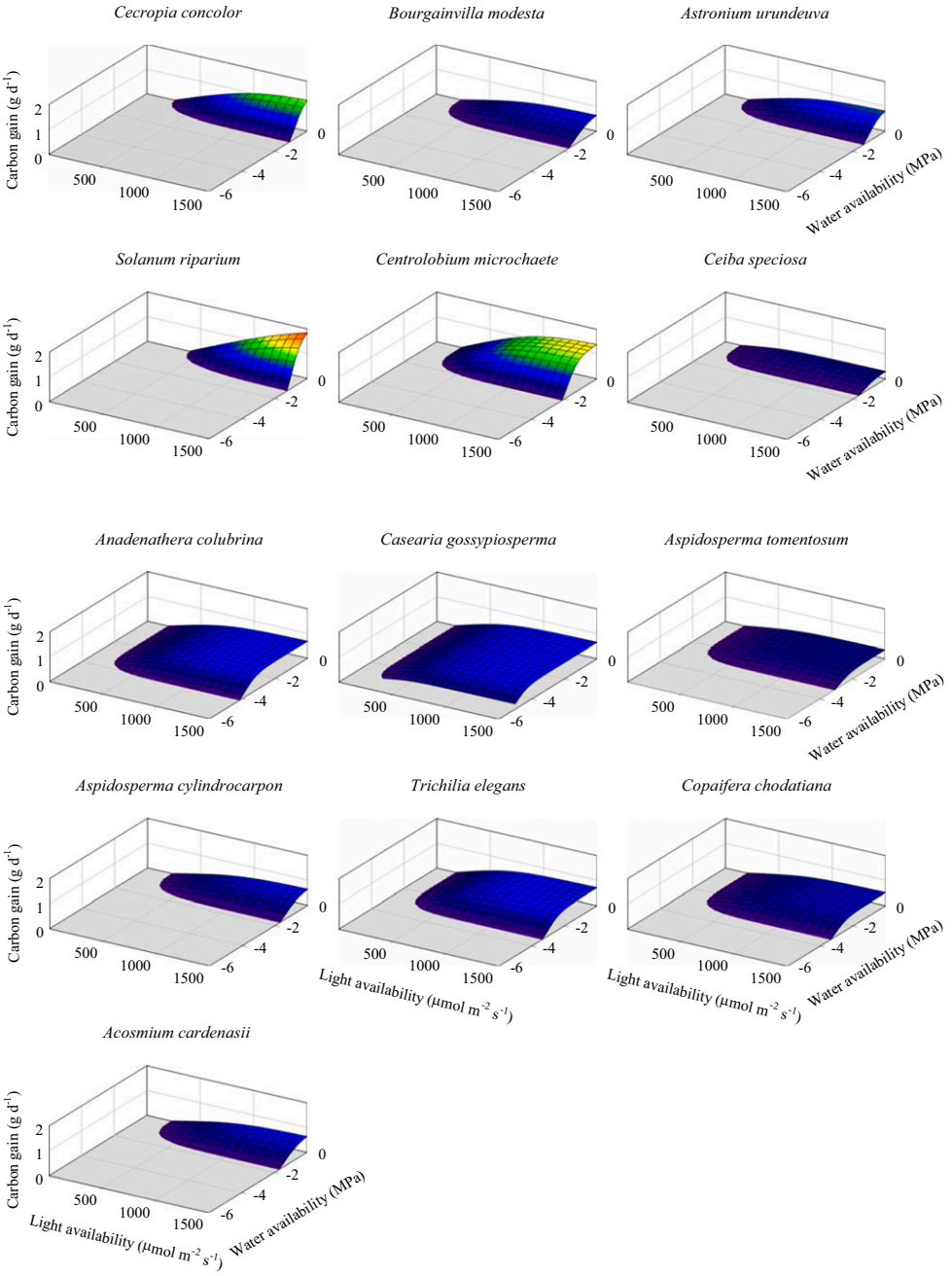

Fig. S2. The predicted carbon gain P_n (g·d^{-1}) along gradients of light and water availability. Light availability is given by the vertical light intensity (μmol·m^{-2}·s^{-1}), and water availability by the soil water potential (MPa). To make the zero carbon gain isoclines better visible, we do not show negative carbon gain where species are supposed to die due to carbon starvation (but those carbon gain rates are shown in Figs. 1*A* and 2*A*).

Table S1. List of parameters ("constants") in the model: symbols, units, explanation, input values, and literature sources

Symbol	Units	Explanation	Input	Ref.
Roman				
a	Pa	Parameter for stomatal sensitivity function g_ψ	2	(1)
a_ψ	MPa^{-1}	Slope parameter in stomatal sensitivity function g_ψ	3.2	(1)
c_a	Pa	Atmospheric CO_2 pressure	30	(2)
D	Pa	Vapor pressure difference between leaves and atmosphere	950	(2)
G_{s0}	$\mu mol\ C{\cdot}s^{-1}$	Residual stomatal conductance of the plant	0	
I	$\mu mol{\cdot}m^{-2}{\cdot}s^{-1}$	Light intensity in horizontal plane above the plant or canopy	0–1,500	
k_c	$\mu mol\ C{\cdot}kg\ N^{-1}{\cdot}s^{-1}$	Carboxylation capacity per unit nitrogen	83,000	(3)
K_{cmm}	Pa	Michaelis–Menten constant for carboxylation	40.4	(4)
k_j	$\mu mol\ C{\cdot}kg\ N^{-1}{\cdot}s^{-1}$	Electron transport capacity per unit nitrogen	1,050,000	(3)
K_{omm}	Pa	Michaelis–Menten constant for oxygenation	24,800	(4)
K_l	—	Light extinction coefficient of crown	0.86	(4)
o	Pa	O_2 concentration in leaf, same as in atmosphere	21,000	(4)
p_a	Pa	Atmospheric pressure	100,000	(2)
q	$\mu mol{\cdot}\mu mol^{-1}$	Quantum yield (μmol electrons per photon)	0.25	(4)
r_n	$\mu mol\ C{\cdot}kg\ protein^{-1}{\cdot}s^{-1}$	Mass-based respiration rates for photosynthetic leaf mass	1,000	
r_s	$\mu mol\ C{\cdot}kg^{-1}{\cdot}s^{-1}$	Mass-based respiration rates for sapwood	0.4	
r_w	$\mu mol\ C{\cdot}kg^{-1}{\cdot}s^{-1}$	Mass-based respiration rates for structural leaf mass	4.0	
Greek				
γ_{wc}		Ratio H_2O/CO_2 diffusivity	1.6	(4)
θ_j	—	Curvature factor for the electron transport rate process	0.5	(4)
ρ_w	$kg{\cdot}m^{-2}$	Structural leaf mass per unit leaf area	0.05	
ρ_n	$kg\ protein{\cdot}kg^{-1}\ N$	Protein mass per nitrogen mass	5.88	
Γ	Pa	CO_2 compensation point	3.7	(1)
ψ_b	MPa	Water potential at the stem basis	−8–0	

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Table S2. The variables that are calculated by the model and used for explanation of the model in *SI Text S1*

Symbol	Units	Explanation
Roman		
A_c	m^2	Crown area
c_i	Pa	Internal leaf CO_2 pressure
E	$\mu mol{\cdot}s^{-1}$	Transpiration rate of plant
F	$\mu mol{\cdot}s^{-1}$	Water flux through plant
G_s	$\mu mol\ C{\cdot}s^{-1}$	Stomatal conductance of the plant
I_a	$\mu mol{\cdot}m^{-2}{\cdot}s^{-1}$	Photon absorption rate by plant per ground area
L_s	m	Average distance between stem base and crown leaves
M_w	kg	Structural leaf mass
M_n	kg	Photosynthetic mass in leaves (proteins)
M_s	kg	Living sapwood mass in plant
M	kg	Total vegetative plant mass
P_c	$\mu mol\ C{\cdot}s^{-1}$	Carboxylation limited photosynthesis rate of plant
P_g	$kg\ C{\cdot}d^{-1}$ (or $\mu mol\ C{\cdot}s^{-1}$)	Gross photosynthesis rate of the plant per day
P_j	$\mu mol\ C{\cdot}s^{-1}$	Electron transport limited photosynthesis rate of the plant
P_n	$kg\ C{\cdot}d^{-1}$ (or $\mu mol\ C{\cdot}s^{-1}$)	Net photosynthesis rate of the plant per day: $P_g - R_m$
R_m	$kg\ C{\cdot}d^{-1}$	Maintenance respiration rate
V_c	m^3	Crown volume
Greek		
υ_j	—	Fractions of nitrogen allocated to electron transport
ψ_l	MPa	Water potential at the focal point in crown
ψ_g	MPa	Water potential loss due to gravity in crown cylinder

Table S3. List of functional traits

Symbol	Units	Explanation
Roman		
A_l	m^2	Total leaf area
A_s	cm^2	Stem sapwood area
h_t	m	Height of the top of the plant
h_b	m	Height of the bottom of the crown
K_s	$kg{\cdot}m^{-1}{\cdot}s^{-1}{\cdot}MPa^{-1}$	Specific hydraulic conductivity of sapwood
LAI	$m^2{\cdot}m^{-2}$	Leaf area index or total leaf area per unit ground area: $LAI = A_l{\cdot}A_c^{-1}$
LMA	$kg{\cdot}m^{-2}$	Leaf mass per unit leaf area
N_{mass}	kg $N{\cdot}kg^{-1}$ leaf	Average photosynthetic nitrogen mass per unit leaf mass
r	m	Radius of the crown cylinder
Greek		
λ_l	$m^2{\cdot}m^{-3}$	Leaf area density in the crown cylinder: $\lambda_l = A_l{\cdot}V_c^{-1}$
λ_s	$m^2{\cdot}m^{-3}$	Sapwood area density in the crown cylinder: $\lambda_s = A_s{\cdot}V_c^{-1}$
ρ_s	$kg{\cdot}m^{-3}$	Sapwood mass per unit volume
ψ_{ref}	Pa	Water potential for stomatal sensitivity function g_ψ is about half the maximum; minimum leaf water potential ψ_{min} is taken as proxy*

Model entries are based on data of saplings of 13 tree species of a Bolivian forest.
*See Table S4.

Table S4. Species-specific functional trait values for six pioneer tree species and seven shade-tolerant tree species of the Bolivian Inpa forest

Trait units	LAI, $m^2{\cdot}m^{-2}$	A_s, cm^2	LMA, $kg{\cdot}m^{-2}$	ψ_{min}, MPa	ρ_s, $kg{\cdot}m^{-3}$	K_s*	N_{mass}, $kg{\cdot}kg^{-1}$
Pioneers							
Cecropia concolor	1.640 (0.52)	0.31 (0.054)	0.057 (0.003)	−0.17 (0.020)	211 (23)	5.0 (0.679)	0.022
Bougainvillea modesta	0.741 (0.031)	0.17 (0.023)	0.134 (0.006)	−0.96 (0.087)	419 (17)	0.7 (0.074)	0.019
Astronium urundeuva	0.988 (0.205)	0.09 (0.023)	0.092 (0.006)	−0.5 (0.044)	383 (19)	16.0 (1.340)	0.025
Solanum riparium	2.331 (0.155)	0.23 (0.029)	0.167 (0.012)	−0.39 (0.033)	250 (23)	11.3 (0.974)	0.018
Centrolobium microchaete	2.390 (0.586)	0.25 (0.065)	0.060 (0.004)	−1.35 (0.378)	301 (27)	9.1 (0.604)	0.027
Ceiba speciosa	0.473 (0.046)	0.06 (0.006)	0.086 (0.003)	−0.84 (0.06)	241 (23)	7.3 (0.419)	0.020
Shade tolerants							
Anadenanthera colubrina	0.968 (0.057)	0.15 (0.008)	0.063 (0.002)	−3.42 (0.156)	499 (17)	2.6 (0.159)	0.027
Casearia gossypiosperma	1.062 (0.116)	0.15 (0.010)	0.049 (0.001)	−2.8 (0.178)	524 (14)	2.2 (0.222)	0.034
Aspidosperma tomentosum	0.459 (0.085)	0.10 (0.013)	0.090 (0.002)	−2.34 (0.12)	624 (21)	2.2 (0.081)	0.024
Aspidosperma cylindrocarpon	0.970 (0.082)	0.13 (0.012)	0.052 (0.010)	−1.75 (0.07)	492 (35)	2.5 (0.103)	0.026
Trichilia elegans	1.123 (0.274)	0.18 (0.016)	0.051 (0.003)	−2.59 (0.172)	571 (38)	1.9 (0.265)	0.034
Copaifera chodatiana	0.620 (0.227)	0.17 (0.063)	0.121 (0.003)	−2.6 (0.032)	629 (16)	2.8 (0.169)	0.019
Acosmium cardenasii	0.840 (0.097)	0.16 (0.013)	0.103 (0.003)	−3.3 (0.134)	514 (37)	1.2 (0.079)	0.025

We present mean values and SEs (in parentheses) for five saplings per species, except for N_{mass} (for which a pooled sample of five saplings was analyzed) (1). Functional plant trait abbreviations: A_s, the stem sapwood cross-section area; K_s, the specific hydraulic conductivity; LAI, leaf area index; LMA, the leaf mass per area; N_{mass}, the nitrogen mass per leaf mass; ψ_{min}, the minimum leaf water potential after 2 dry months; and ρ_s, the wood density.
*Units for K_s: $kg{\cdot}m^{-1}{\cdot}s^{-1}{\cdot}MPa^{-1}$.

1. Markesteijn L, Poorter L, Bongers F (2007) Light-dependent leaf trait variation in 43 tropical dry forest tree species. *Am J Bot* 94:515–525.