6 Supplementary Material

6.1 Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Units</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of leaves produced by height increment</td>
<td>$\kappa$</td>
<td>345</td>
<td>nb leaves.m$^{-2}$.m$^{-1}$.tree$^{-1}$</td>
<td>Calibrated using leaf production on the +K Itatinga stand</td>
</tr>
<tr>
<td>Leaf Lifespan</td>
<td>$LLS$</td>
<td>400</td>
<td>days</td>
<td>Calibrated using leaf production, biomass and fall measurements on the +K Itatinga stand</td>
</tr>
<tr>
<td>Target leaf area</td>
<td>$S_{\text{max}}$</td>
<td>2750</td>
<td>mm$^2$</td>
<td>Measured in scans from the +K stand</td>
</tr>
</tbody>
</table>

Table S1: Parameters related to the leaf cohort sub-model that were modified from Part 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Units</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity parameter for soluble sugar allocation</td>
<td>$p_{ss}$</td>
<td>0.1</td>
<td>unitless</td>
<td>Assumed</td>
</tr>
<tr>
<td>Sensitivity parameter for fine roots allocation</td>
<td>$p_{FR}$</td>
<td>0.1</td>
<td>unitless</td>
<td>Assumed</td>
</tr>
<tr>
<td>Conversion from LAI to target root biomass</td>
<td>$\lambda$</td>
<td>80</td>
<td>gC.m$^{-2}$.leaves</td>
<td>Calibrated on the +K stand</td>
</tr>
<tr>
<td>Optimal wood K concentration at creation</td>
<td>$[K]_{\text{opt, Trunk}}$</td>
<td>0.0038</td>
<td>gK.gDM$^{-1}$</td>
<td>Maximum K wood concentration measured on the +K stand</td>
</tr>
<tr>
<td>Minimal wood K concentration in a cohort</td>
<td>$[K]_{\text{min, Trunk}}$</td>
<td>0.0005</td>
<td>gK.gDM$^{-1}$</td>
<td>Minimum K wood concentration measured on the +K stand</td>
</tr>
<tr>
<td>NPP driven rate of remobilisation of K in wood</td>
<td>$T_{K_{\text{Trunk}}}$</td>
<td>0.00216</td>
<td>unitless</td>
<td>Calibrated on K wood concentrations measured on the +K stand</td>
</tr>
<tr>
<td>remobilisation efficiency of K in dying branches</td>
<td>$R_{K_{\text{Branches}}}$</td>
<td>0.8</td>
<td>unitless</td>
<td>Measured difference in K content between live branches and dead branches in the +K stand</td>
</tr>
<tr>
<td>Annual turnover rate for branches</td>
<td>$M_{\text{Branches}}$</td>
<td>0.31</td>
<td>yr$^{-1}$</td>
<td>Calculated from biomass and necromass measurements in the +K stand</td>
</tr>
<tr>
<td>Annual turnover rate for fine roots</td>
<td>$M_{FR}$</td>
<td>0.71</td>
<td>yr$^{-1}$</td>
<td>(Lambais et al., 2017)</td>
</tr>
<tr>
<td>Annual turnover rate for bark</td>
<td>$M_{Bark}$</td>
<td>0.001</td>
<td>yr$^{-1}$</td>
<td>Calculated from biomass and necromass measurements in the +K stand</td>
</tr>
<tr>
<td>Exponential factor</td>
<td>$Q_{10}$</td>
<td>2</td>
<td>unitless</td>
<td>(Ryan et al., 2009)</td>
</tr>
<tr>
<td>Reference Temperature</td>
<td>$T_{\text{MR}}$</td>
<td>25</td>
<td>$^\circ$C</td>
<td>(Ryan et al., 2009)</td>
</tr>
</tbody>
</table>

Table S2: New parameters related to C and K allocation

6.2 Figures
Figure S1: Tree height as a function of trunk biomass. The function was well adjusted.
Figure S2: a) Branch N content in function of the biomass of living branches b) The trunk’s N content in function of the trunk biomass.
Figure S3: a) Turnover of bark in different fertilisation and rainfall exclusion plots (-W is 30% of rainfall removed). Each data is a separate data point. b) The turnover of branches in the same conditions.
Figure S4: Branch resorption efficiencies for K (a) and N (b) that were calculated using annual measurements of K concentrations of live and dead branches on the same tree. Each data point is a tree in each treatment.
Figure S5: Wood K content as a function of trunk biomass. A decreasing function was adjusted to the data. This function was not used in the model but the parameters were used to parametrise the K wood cohort model. The non-limited wood concentration at the creation of the cohort was equal to $a + c$ of the function shown in the inset and the minimal wood K content was similar to $c$ (but corrected to account for the newly created cohorts in trunk wood).
Figure S6: a) The response of cumulated NPP$_{trunk}$ to two different fertilisation regimes (applied once at planting in red and over 4 application over the early growth in blue) along a fertilisation gradient. 
b) The response of NPP CUE and trunk CUE to K fertilisation ranging from 0gK.m$^{-2}$ to 17gK.m$^{-2}$

Figure S7: The fertiliser use efficiencies of NPP and of trunk production in function of the fertilisation level of the simulated stand.