Supplementary

Table S1 Summary of parameters included in the phenology, and the carbon (C) and nitrogen (N) allocation. The baseline values were determined by either through model calibration, field measurements or published values in literature.

Parameter	Definition	Unit	Baseline value	Additional information about the baseline value	Process it influences
SWPc	Critical soil water potential (SWP)	MPa	-2.34	- calibrated value	- Phenology; leaf onset and leaf offset - Leaf Litter-fall rates
SWPd	Soil water index accumulator	number of days	15	- calibrated value	- Phenology; leaf onset and leaf offset - Leaf Litter-fall rates
Tap_npp	Proportion of tapping taken from NPP	unitless	0.14	- calibrated value	- C and N allocation - Net primary productivity, Yield
Tap_partition	Proportion of tapping taken from partitioning of growth and storage pools	unitless	0.2	- calibrated value	- C and N allocation - Net primary productivity - Yield
SLA	Specific leaf area	$m^2\ g^{-1}C$	0.024	- value from current study site - literature	- Net primary productivity - Yield
F_{LNR}	Fraction of leaf N in Rubisco enzyme.	gN Rubisco $g^{-1}N$	0.11	- derived using SLA, leafcn and Vcmax25	- Net primary productivity - Yield
leafcn	Carbon nitrogen ratio in leaf	$gC\ g^{-1}N$	20	- value from current study site	- Net primary productivity - Yield
lflitcn	Carbon nitrogen ratio in leaf litter	$gC\ g^{-1}N$	39.3	- value from current study site	- Litter decomposition
Ball-berry slope	unitless	unitless	5	- calibrated value	- Transpiration - Photosynthesis

Figure S1 Measured and modeled above ground biomass (a) and net primary productivity (b) of rubber plantation for the spin-up case. The vertical lines in the measurement indicates the standard error across the four plots.

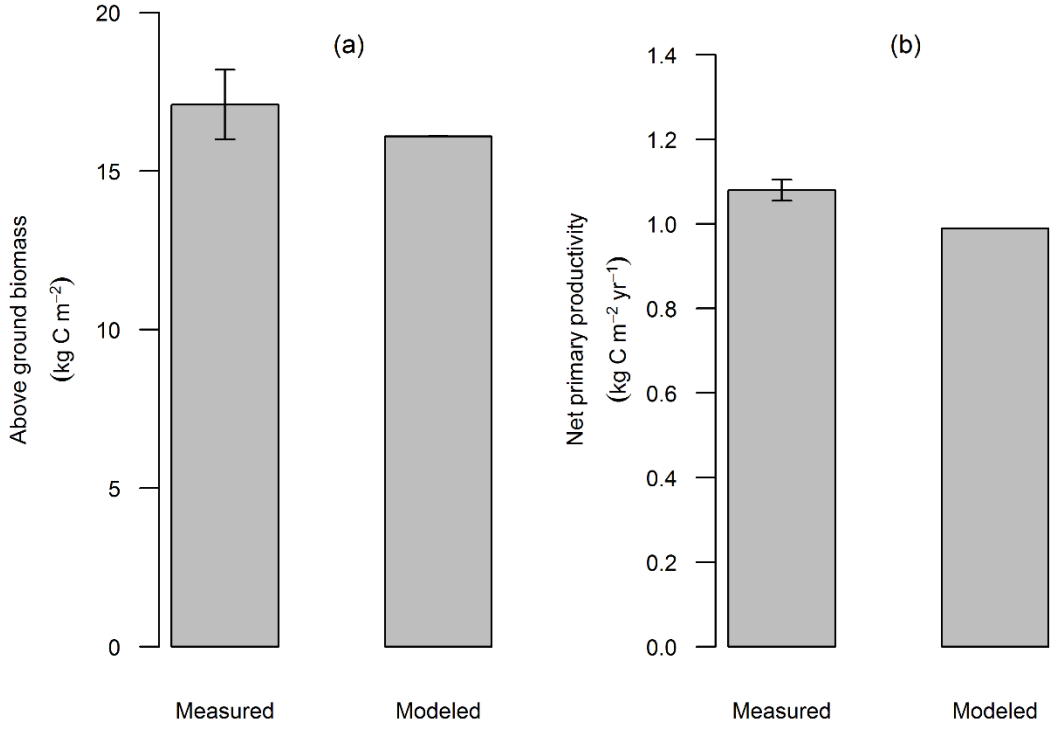


Figure S2 Temporal trends of annual net primary productivity (NPP; kg C m^{-2} yr^{-1}) and annual above ground biomass (AGB; kg m^{-2}) of rubber plants simulated by CLM-rubber following clear-cut in 2003 in the Bukit Duabelas landscape. Measured NPP and AGB (lines are standard errors, n =4 plots) are indicated.

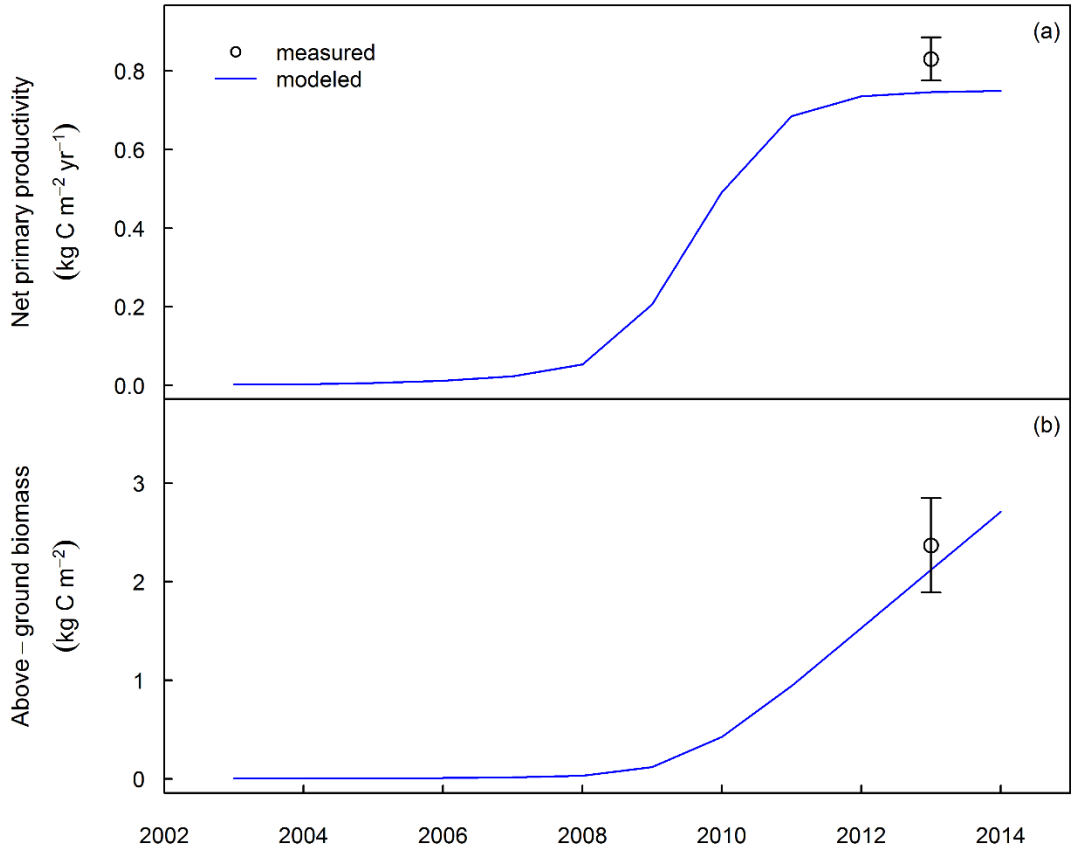


Figure S3 Measured (lines are standard errors, n = 4 plots) and CLM-simulated fine root biomass (a) and annual latex yield (b) of rubber plantation for 2013 in the Bukit Duabelas landscape.

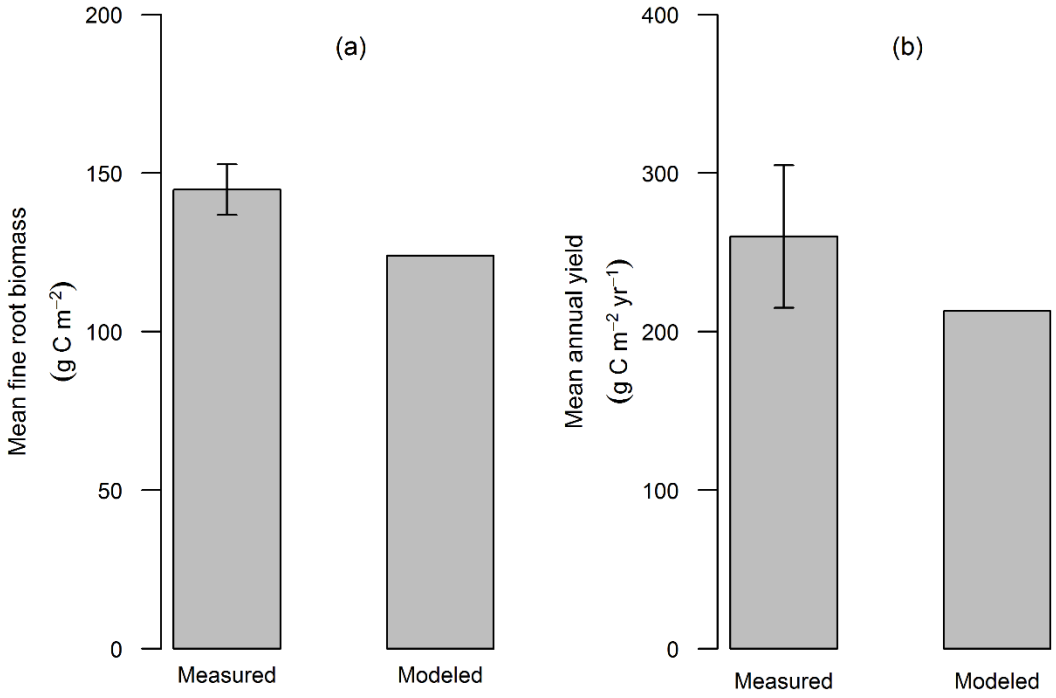


Figure S4 Monthly trends of leaf litter fall ((a); g C m^{-2} yr^{-1}), soil respiration ((b); kg C m^{-2} yr^{-1}), soil moisture up to 5 cm ((c); m^3 m^{-3}) and leaf area index ((d); m^2 m^{-2}) of rubber plants simulated by CLM-rubber (blue line) and observed values (open circles) during the mature phase of growth of rubber in the Bukit Duabelas landscape. The leaf area index was measured in 2018. The vertical lines are standard errors across 4 plots.

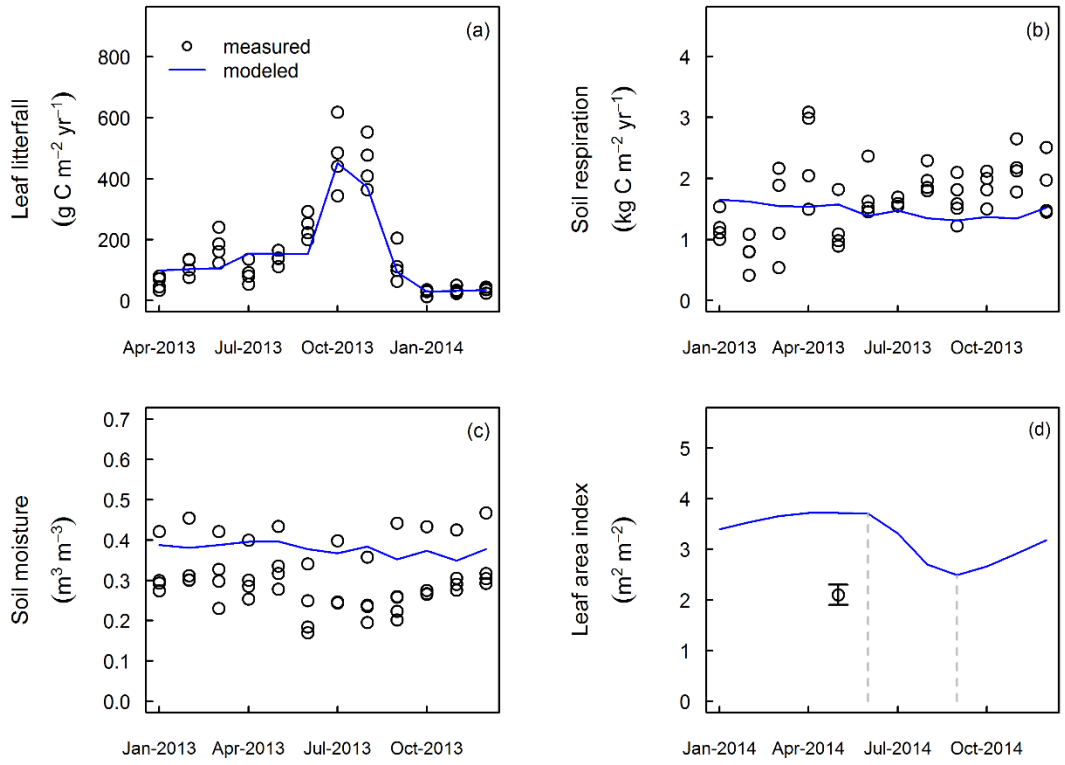


Figure S5 Measured and CLM-simulated diel transpiration (mm hr^{-1}) for rubber averaged over February, March and April 2013 in the Bukit Duabelas landscape.

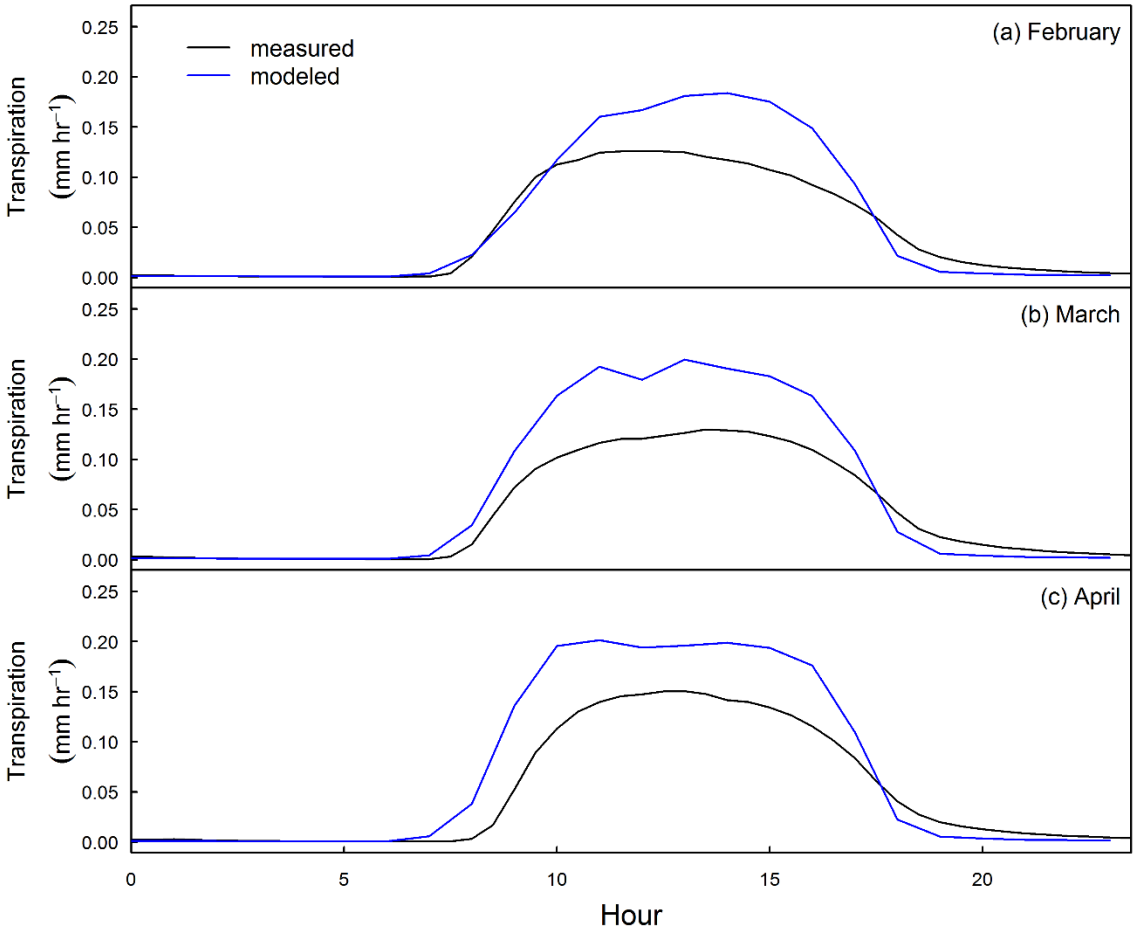


Figure S6 Measured and CLM-rubber simulated daily transpiration for rubber in the Bukit Duabelas landscape, where a relatively long period of leaf-shedding was observed in 2013.

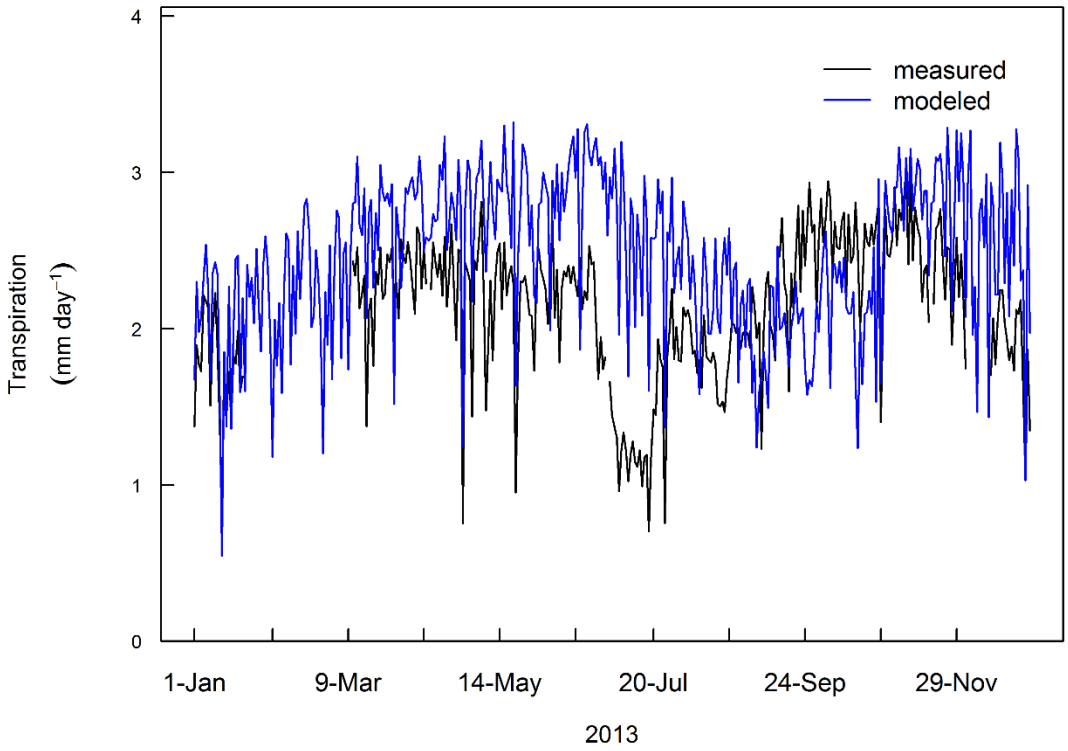


Figure S7 Diel trends of net radiation, air temperature and vapor pressure deficit for June 2013 in the Harapan landscape.

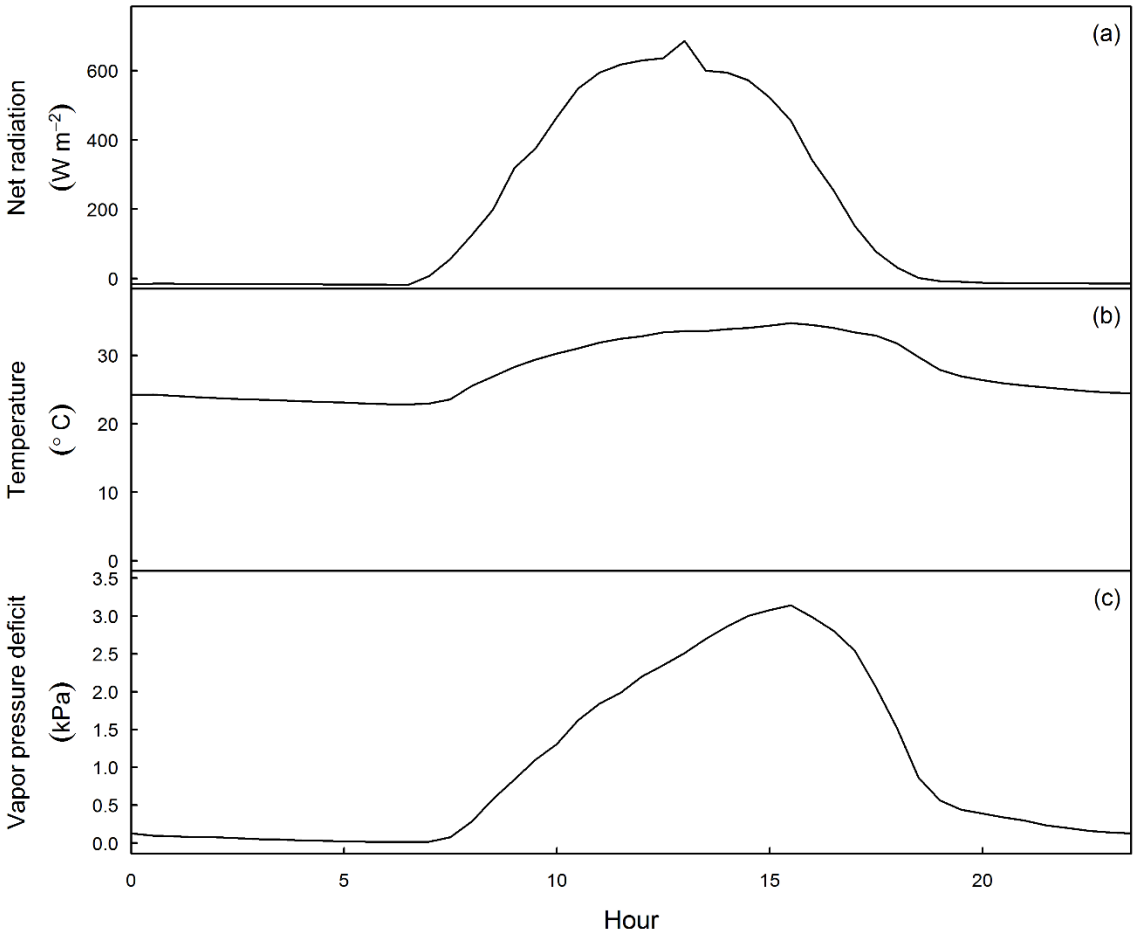
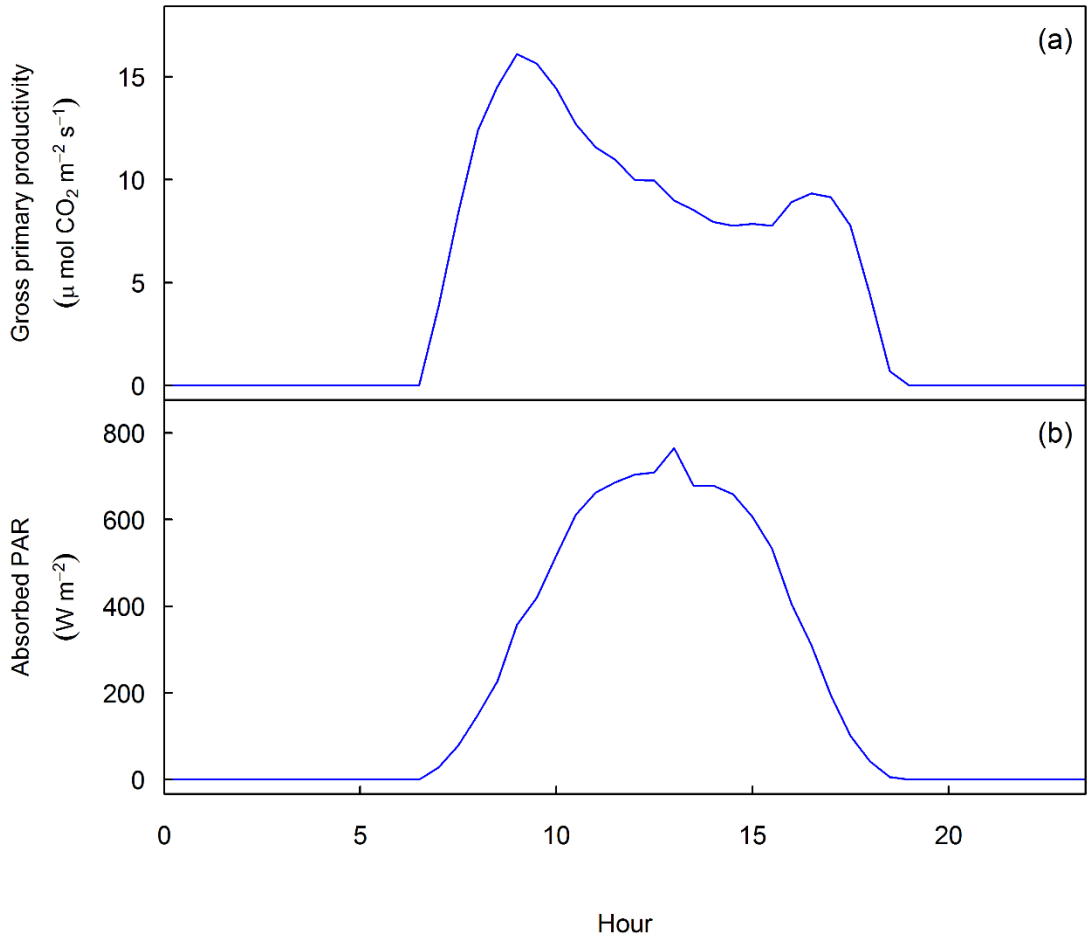


Figure S8 Diel trends of CLM-rubber simulated gross primary productivity (a) and absorbed photosynthetically active radiation ((b) absorbed PAR) for June 2013 in the Harapan landscape.



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