

Supplementary tables and figures

Supplementary Table 1. Agro-climatic conditions of the study sites

Location	Latitude and longitude	Agro-ecological region	Altitude (m)	Annual average rainfall ¹ (mm)	Soil type ²	Daily mean temperature ³ (°C)
<i>KN</i>	9.38°N, 80.40°S	DL ₃	15	950	Red Yellow Latasols	27.7
<i>MI</i>	8.10°N, 80.31°S	DL _{1b}	117	1000	<i>Aluthwewa</i> Series	27.6
<i>KD</i>	7.26°N, 80.70°S	IM _{3a}	367	1500	<i>Kundasale</i> Series	25.2
<i>RG</i>	6.82°N, 80.89°S	IU _{3d}	1558	1450	<i>Bandarawela</i> Series	19.6

Source: ¹Punyawardana 2008; ²Mapa *et al.* 2020; ³Natural Resource Management Centre, Department of Agriculture, Sri Lanka. Annual mean temperature was calculated using monthly average maximum and minimum temperatures (For *Mahailluppallama* and *Kundasale* from 2000 to 2009; for *Rahangala* from 1992 to 2001; and data from *Paranthan* were used for *Killinochchi* from 1976-1985).

Supplementary Figure 1.

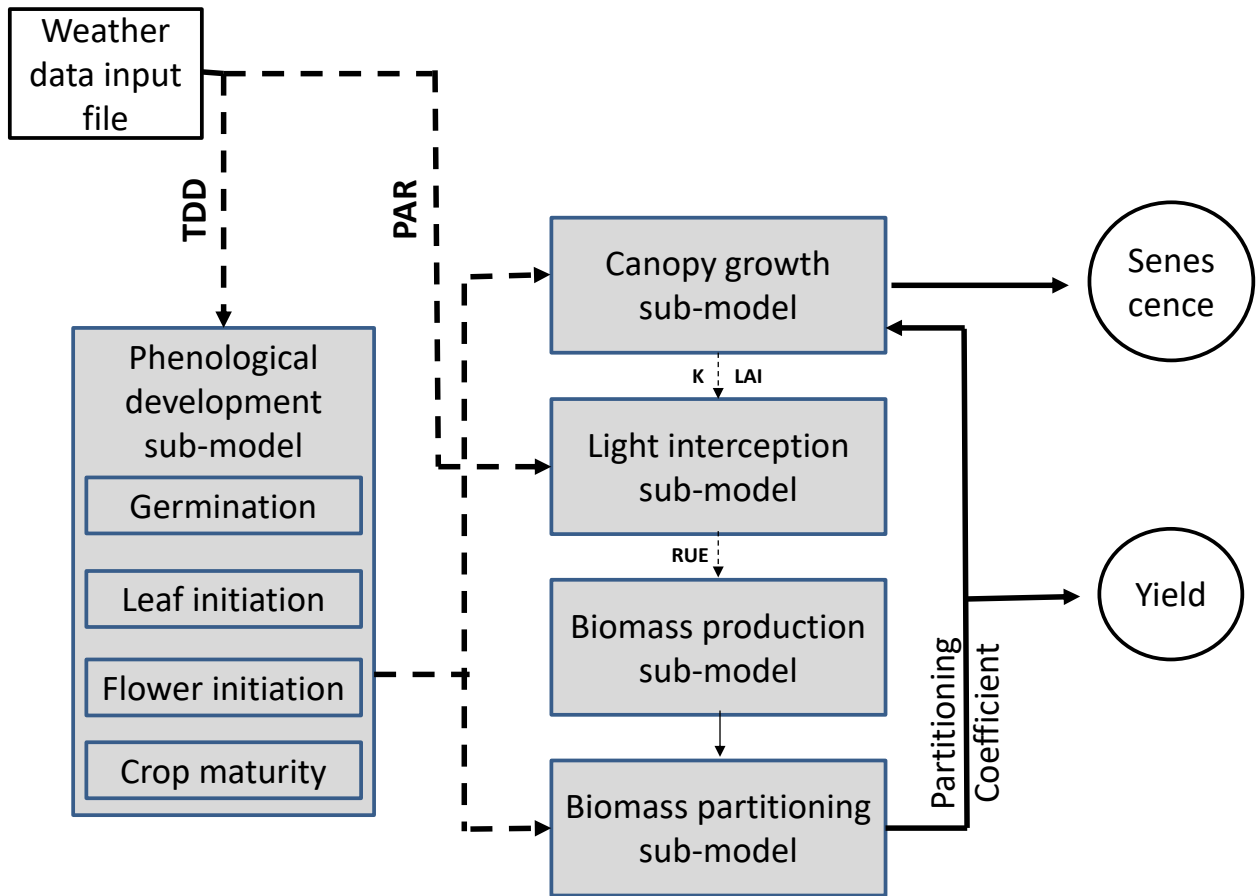


Fig. S1. Schematic overview of the model. Rectangle: represents the state variables; rectangle shaded: represents the growth models. Yield and litter fall are the biomass exports from the system. Solid line: materials flow and dashed line: flow or effects. Photosynthetically active radiation (PAR), thermal time in terms of degree days (TDD), light extinction coefficient (k), radiation use efficiency (RUE) and leaf area index (LAI).

Supplementary Figure 2.

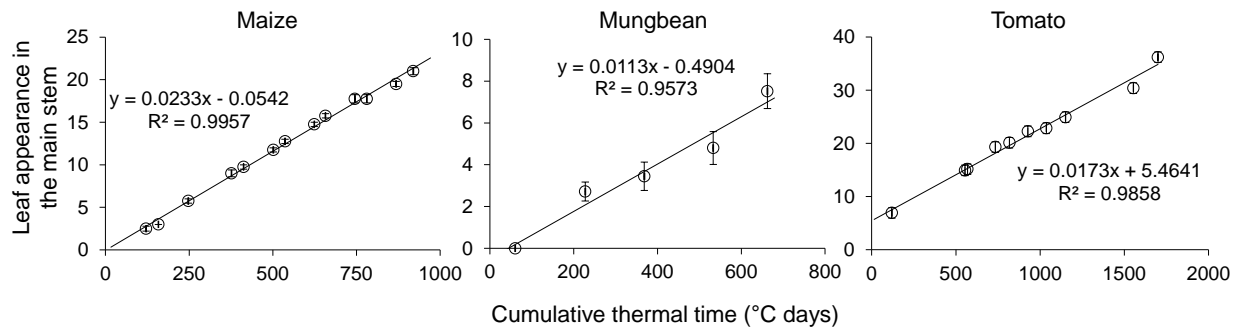


Fig. S2. Relationships between the cumulative thermal time and leaf appearance in the main stem of maize, mungbean and tomato (mean \pm standard error, $n=12$). Data were collected from the crops grown under recommended management practices at *Kundasale* during the first and second cropping seasons (mean \pm standard error, $n=12$).

Supplementary Figure 3.

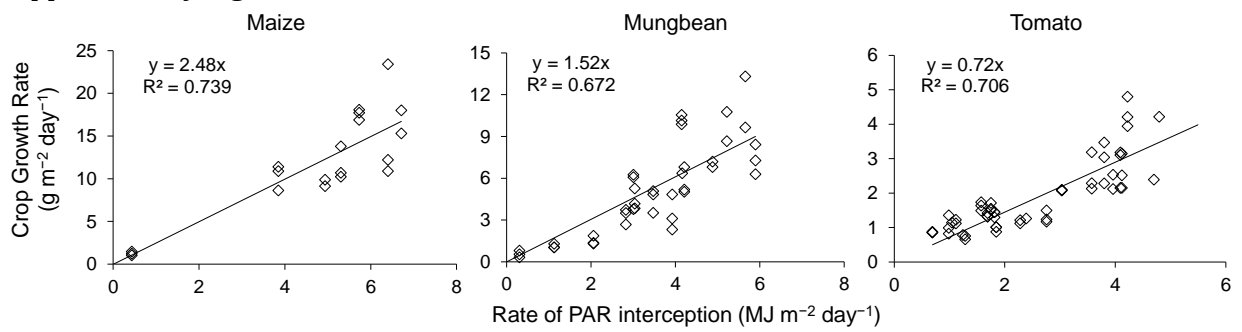


Fig. S3. Relationships between the rate of intercepted PAR and crop growth rate of maize, mungbean and tomato. Crop growth rate was measured on crops grown under recommended management practices during the first two cropping seasons at *Kundasale*. Intercepted PAR was estimated based on LAI and the light extinction coefficient.