

## Supplementary file

# The Role of Crop Management Practices and Adaptation Options to Minimize the Impact of Climate Change on Maize (*Zea Mays* L.) Production for Ethiopia

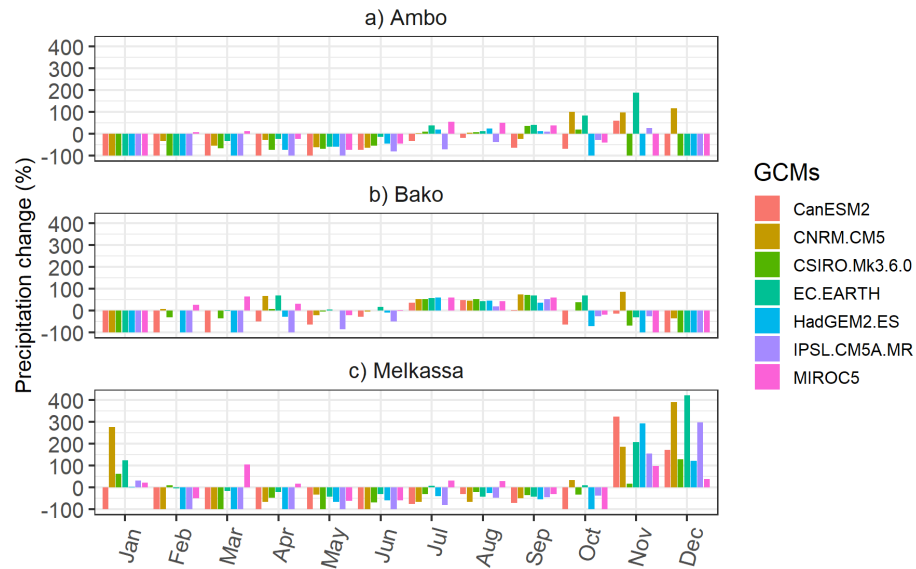
Hirut Getachew Feleke <sup>1\*</sup>, Michael J. Savage <sup>1</sup>, Kindie Tesfaye <sup>2</sup> and Fasil Mequanint<sup>3</sup>

<sup>1</sup> Agrometeorology Discipline, Soil-Plant-Atmosphere Continuum Research Unit, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg, South Africa

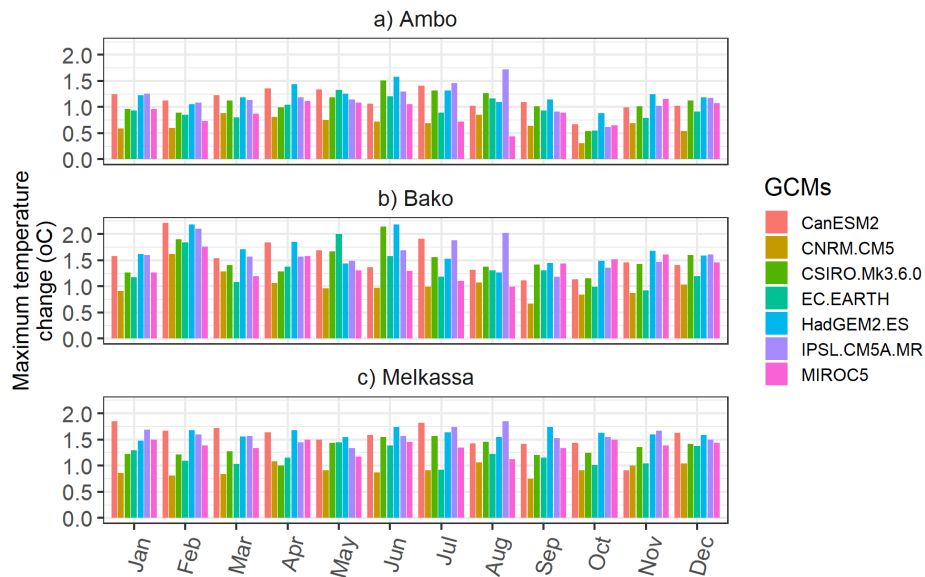
<sup>2</sup> International Maize and Wheat Improvement Centre (CIMMYT), Addis Ababa, Ethiopia

<sup>3</sup> Institute of Soil Science and Land Evaluation, Biogeophysics, University of Hohenheim, Stuttgart, Germany

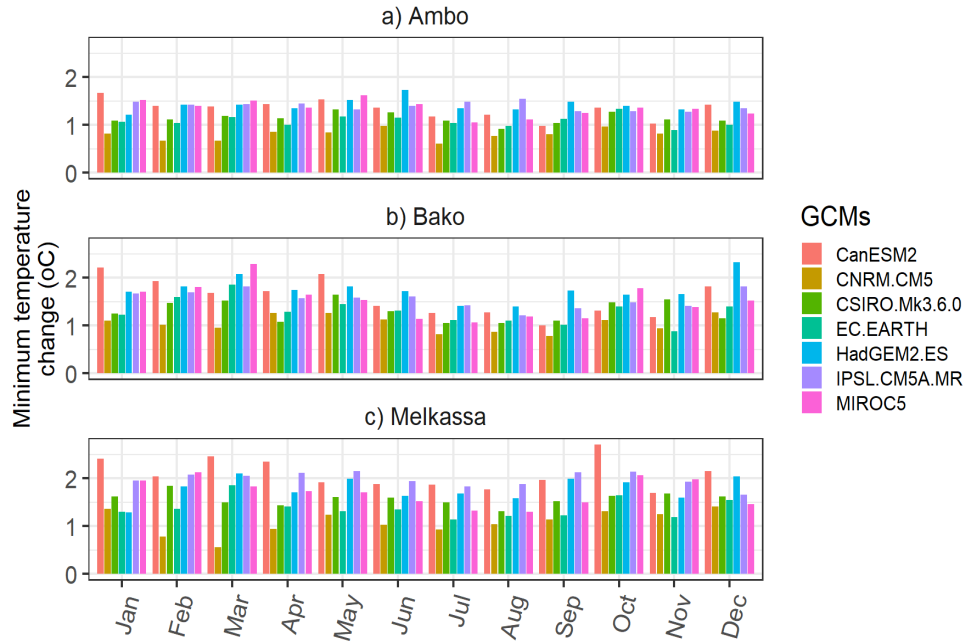
\* Correspondence: [hirut\\_ge@yahoo.com](mailto:hirut_ge@yahoo.com)



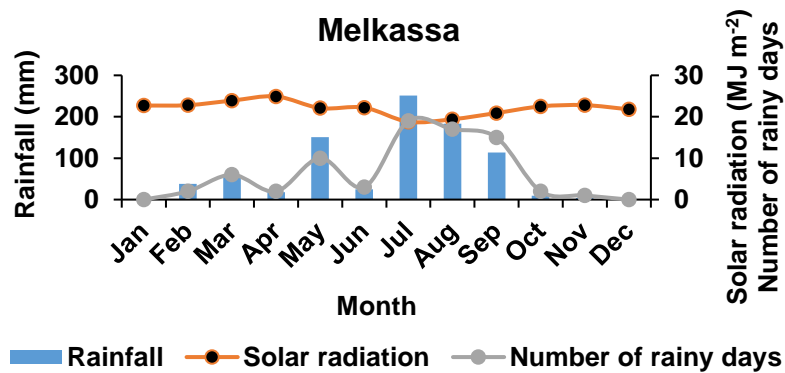
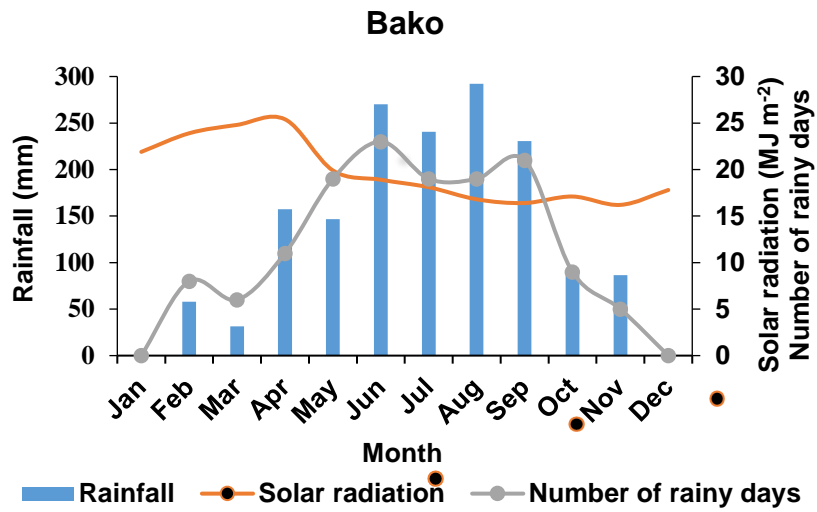
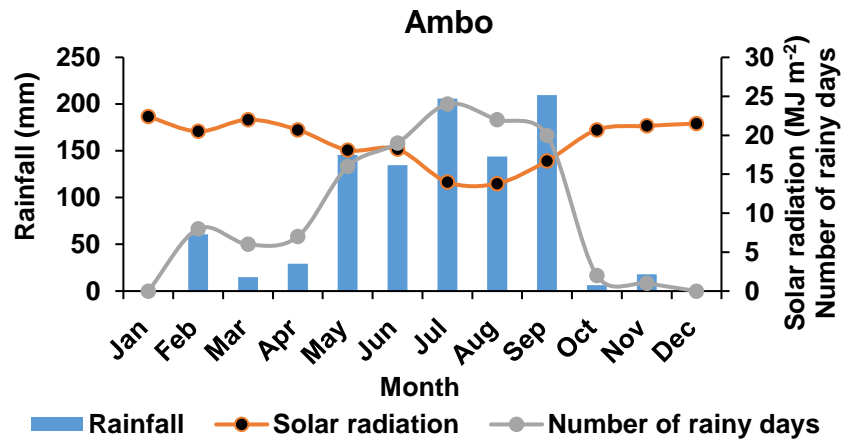
**Supplementary Figure S1.** Percentage changes in monthly total precipitation of the projected climate by 2030s from the baseline period (1995-2017) as projected by seven GCMs under RCP 8.5 for the three sites (a) Ambo (high altitude), (b) Bako (mid-altitude), and (c) Melkassa (low altitude).



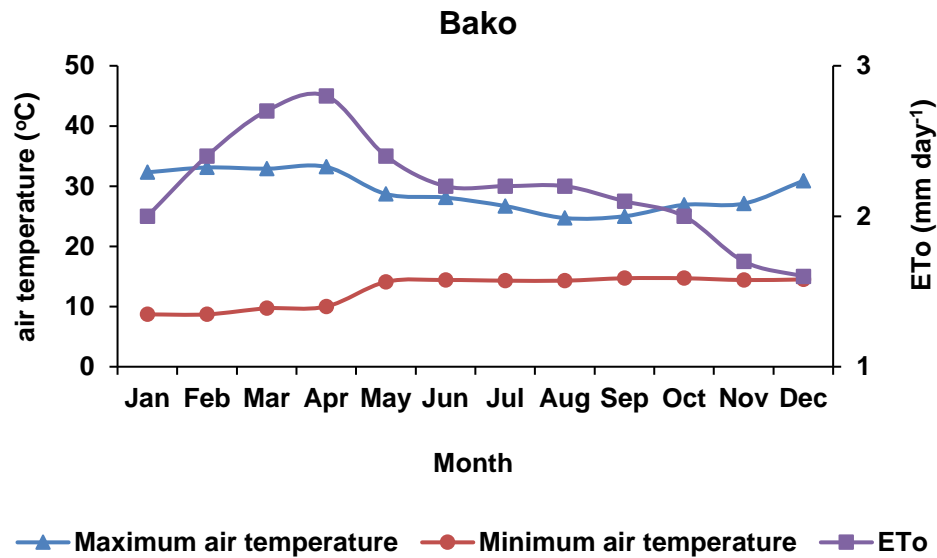
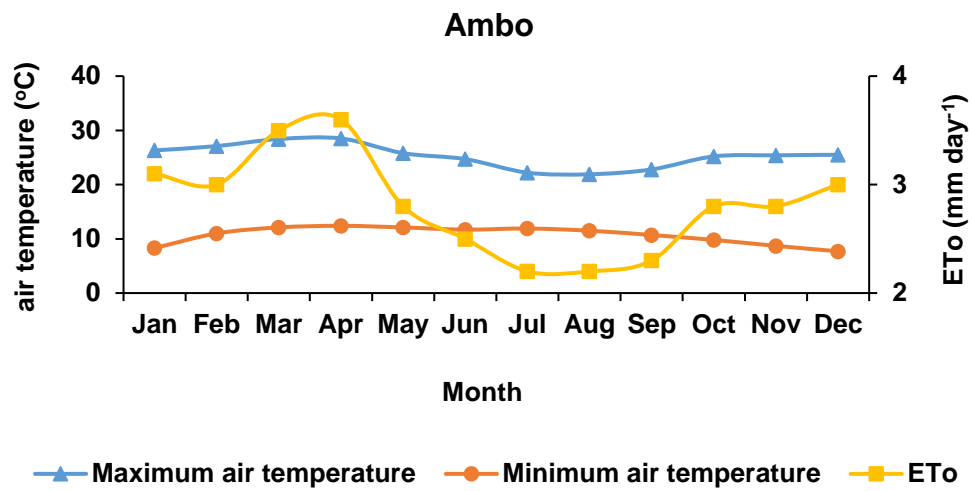
**Supplementary Figure S2.** Projected changes in monthly average maximum air temperature (°C) by 2030s from the base period (1995-2017) as projected by seven GCMs' under 8.5 RCP for (a) Ambo (high altitude), (b) Bako (mid-altitude), and (c) Melkassa (low altitude).

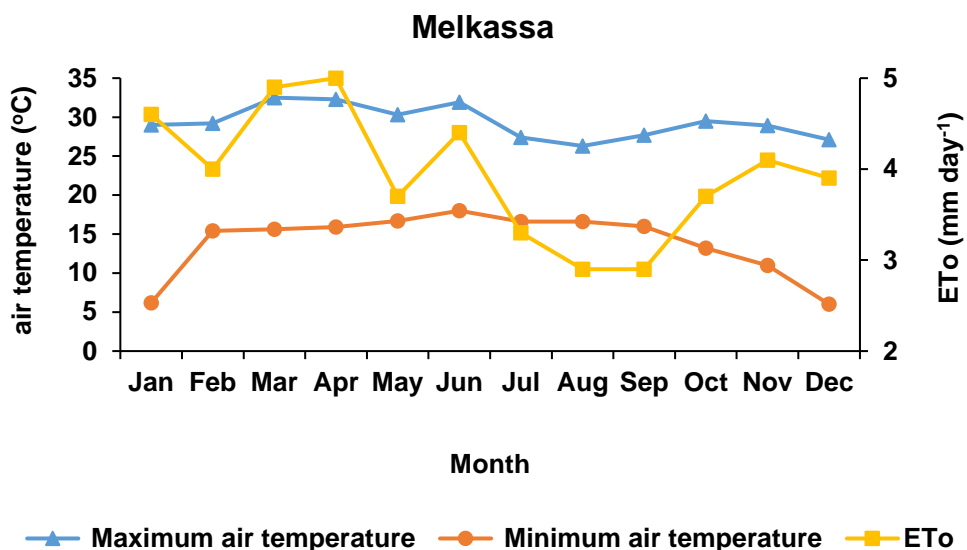


**Supplementary Figure S3.** Projected changes in monthly average minimum air temperature (°C) by 2030s from the base period (1995-2017) as projected by seven GCMs' under 8.5 RCP for (a) Ambo (high altitude), (b) Bako (mid-altitude) and (c) Melkassa (low altitude).



Supplementary Figure S4. Monthly total rainfall, average solar radiation, and the number of rainy days for the crop growing season 2017/2018 for Ambo, Bako, and Melkassa sites.





**Supplementary Figure S5.** Monthly average maximum and minimum air temperature, and ETo for the crop growing season 2017/2018 for Ambo, Bako, and Melkassa sites.

**Supplementary Table S1.** Main soil properties for the study areas used in the model simulation.

Site	Depth (m)	Silt %	Clay %	BD (kg m <sup>-3</sup> )	UL (m <sup>3</sup> m <sup>-3</sup> )	LL (m <sup>3</sup> m <sup>-3</sup> )	Saturation soil water content	pH
							(m <sup>3</sup> m <sup>-3</sup> )	
Ambo (high altitude)	0.0-0.13	12.00	22.70	1360	0.189	0.092	0.449	6.20
	0.13-0.45	12.00	26.70	1330	0.148	0.077	0.467	6.50
	0.45-0.78	6.00	30.70	1370	0.163	0.084	0.457	6.80
	0.78-1.10	8.00	32.70	1480	0.177	0.088	0.418	6.80
	1.10-1.53	8.00	20.70	1560	0.157	0.085	0.39	7.10
	1.53-1.87	6.00	28.70	1590	0.155	0.109	0.379	7.20
Bako (mid- altitude)	0.0-0.15	24.40	40.90	1130	0.371	0.244	0.446	5.60
	0.15-0.30	23.40	43.50	1160	0.385	0.259	0.445	5.70
	0.30-0.60	22.30	45.80	1210	0.399	0.272	0.463	5.90
	0.60-1.00	21.60	45.90	1270	0.399	0.273	0.462	6.00
	1.00-2.00	21.30	44.40	1320	0.389	0.264	0.455	6.20
Melkassa (low altitude)	0.0-0.15	45.20	20.10	1190	0.343	0.094	0.393	7.30
	0.15-0.30	47.10	19.40	1230	0.337	0.188	0.387	7.50
	0.30-0.60	49.30	19.20	1240	0.348	0.162	0.398	7.60
	0.60-1.00	51.30	18.30	1250	0.352	0.186	0.401	7.80
	1.00-2.00	51.10	18.50	1240	0.378	0.209	0.428	7.90

BD: Bulk density; LL: Lower Limit; UL: Upper Limit.