

Table S1: Statistical metrics comparing the gross primary productivity (GPP), evapotranspiration (ET), and water use efficiency (WUE) estimated by ISBA-A-g_s against in situ measurements at FR-Lam site (units of RMSE are gC m⁻² day⁻¹ for GPP, kg H₂O m⁻² day⁻¹ for ET, and gC kg⁻¹ H₂O for WUE) at daily-scale. In bold fonts are cases when ISBA-A-g_s gave better scores (R²).

Maize year	Scenario	Metric	GPP	ET	WUE
2006	Before Calibration	R ²	0.85	0.71	0.61
		RMSE	2.35	1.96	0.62
	After Calibration	R ²	0.88	0.70	0.64
		RMSE	2.30	1.80	0.59
2008	Before Calibration	R ²	0.93	0.70	0.72
		RMSE	2.21	2.12	0.99
	After Calibration	R ²	0.93	0.71	0.78
		RMSE	1.89	2.05	0.71
2010	Before Calibration	R ²	0.90	0.61	0.41
		RMSE	2.18	1.54	0.83
	After Calibration	R ²	0.92	0.60	0.61
		RMSE	1.88	1.53	0.66
2012	Before Calibration	R ²	0.88	0.57	0.35

		RMSE	3.61	1.48	1.0
	After Calibration	R^2	0.89	0.56	0.67
		RMSE	3.19	1.51	0.66
2014	Before Calibration	R^2	0.84	0.68	0.62
		RMSE	4.88	2.36	0.73
	After Calibration	R^2	0.80	0.68	0.86
		RMSE	4.35	2.22	1.62
	Before Calibration	R^2	0.91	0.86	0.33
		RMSE	2.46	1.63	1.02
After Calibration	R^2	0.92	0.62	0.38	
	RMSE	2.92	0.72	0.70	

Table S2: Statistical metrics comparing the gross primary productivity (GPP), evapotranspiration (ET), and water use efficiency (WUE) estimated by ISBA-A-g_s against in situ measurements at Ind-IITH site (units of RMSE are gC m⁻² day⁻¹ for GPP, kg H₂O m⁻² day⁻¹ for ET, and gC kg⁻¹ H₂O for WUE) at daily-scale. In bold fonts are cases when ISBA-A-g_s gave better scores (R²).

Maize year	Irrigation Type	Scenario	Metric	GPP	ET	WUE	
Monsoon	CFI	Before Calibration	R ²	0.78	0.35	0.25	
			RMSE	2.13	1.71	0.72	
	CFI	After Calibration	R ²	0.83	0.35	0.30	
			RMSE	1.83	1.71	0.61	
	Monsoon	AFI	Before Calibration	R ²	0.50	0.41	0.23
				RMSE	2.59	1.68	1.10
AFI		After Calibration	R ²	0.66	0.43	0.31	
			RMSE	2.08	1.29	1.01	
Winter	CFI	Before Calibration	R ²	0.67	0.40	0.25	
			RMSE	2.59	1.40	0.72	
	CFI	After Calibration	R ²	0.79	0.43	0.37	

			RMSE	2.08	1.29	0.64
			R^2	0.80	0.20	0.20
	AFI	Before Calibration	RMSE	2.43	1.97	1.48
Winter			R^2	0.86	0.25	0.25
	AFI	After Calibration	RMSE	1.86	1.87	1.22