

## Supplementary Materials:

# Planting rice at monsoon onset could mitigate the impact of temperature stress on rice-wheat systems of Bihar, India

Carlo Montes <sup>1,\*</sup>, Anton Urfels <sup>2</sup>, Eunjin Han <sup>3</sup> and Balwinder-Singh <sup>4</sup>

<sup>1</sup> International Maize and Wheat Improvement Center (CIMMYT), Texcoco 56237, Mexico

<sup>2</sup> International Maize and Wheat Improvement Center (CIMMYT), Kathmandu 44700, Nepal

<sup>3</sup> Adaptive Cropping Systems Laboratory, USDA-Agricultural Research Service, Beltsville, MD 20705, USA

<sup>4</sup> Department of Primary Industries and Regional Development, Northam 6401, Australia

\* Correspondence: c.montes@cgiar.org

Table S1. List of soil parameters used for APSIM simulations.

Parameter	Product	Reference
Moist bulk density	GSDE*	[1]
Cation exchange capacity	GSDE	[1]
Drained upper limit	GSDE	[1]
Aluminium	GSDE	[1]
Base saturation	GSDE	[1]
CaCO <sub>3</sub> content	GSDE	[1]
Clay (< 0.002 mm)	GSDE	[1]
Electric conductivity	GSDE	[1]
Exchangeable potassium	GSDE	[1]
Crop lower limit	GSDE	[1]
Exchangeable magnesium	GSDE	[1]
Exchangeable sodium	GSDE	[1]
Total nitrogen	GSDE	[1]
Organic carbon	GSDE	[1]
Total phosphorus	GSDE	[1]
Silt (0.05 to 0.002 mm)	GSDE	[1]
Coarse fraction	SoilGrids	[2]
pH	HWSD**	[3]
Soil root growth factor	-	[4]
Bare soil albedo	-	[5]
Soil evaporation limit	Calculated from texture	
Drainage rate	Calculated from texture	

\*Global Soil Dataset for use in Earth System Models

\*\*Harmonized World Soil Database

1. Shangguan, W.; Dai, Y.; Duan, Q.; Liu, B.; Yuan, H. A global soil data set for earth system modeling. *J. Adv. Model. Earth Syst.* **2014**, *6*, 249–263. <https://doi.org/10.1002/2013ms000293>.

2. Hengl, T.; De Jesus, J.M.; Heuvelink, G.B.M.; Gonzalez, M.R.; Kilibarda, M.; Blagotić, A.; Shangguan, W.; Wright, M.N.; Geng, X.; Bauer-Marschallinger, B.; et al. SoilGrids250m: Global gridded soil information based on machine learning. *PLoS ONE* 2017, 12, e0169748. <https://doi.org/10.1371/journal.pone.0169748>.
3. Fischer, G., F. Nachtergaele, S. Prieler, H.T. van Velthuisen, L. Verelst, D. Wiberg. 2008. Global agro-ecological zones assessment for agriculture (GAEZ 2008). IIASA, Laxenburg, Austria and FAO, Rome, Italy.
4. Jones, C.A., W.L. Bland, J.T. Ritchie, and J.R. Williams. 1991. Simulation of root growth. In: J. Hanks and J.T. Ritchie, editors, *Modeling plant and soil systems*. Agron. Monogr. 31. ASA, CSSA, and SSSA, Madison, WI. p. 91-123.
5. Carrer, D., C. Meurey, X. Ceamanos, J.-L. Roujean, J.-C. Calvet, S. Liu. 2014. Dynamic mapping of snow-free vegetation and bare soil albedos at global 1 km scale from 10-year analysis of MODIS satellite products. *Remote Sens. Environ.* 140, 420-432.