



*Supplement of*

## **Potential impact of climate and socioeconomic changes on future agricultural land use in West Africa**

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**Table S1: Present-day (SPAM 2005) and the LandPro-projected future (mid-21<sup>st</sup> century) average crop area coverage in the West African countries.**

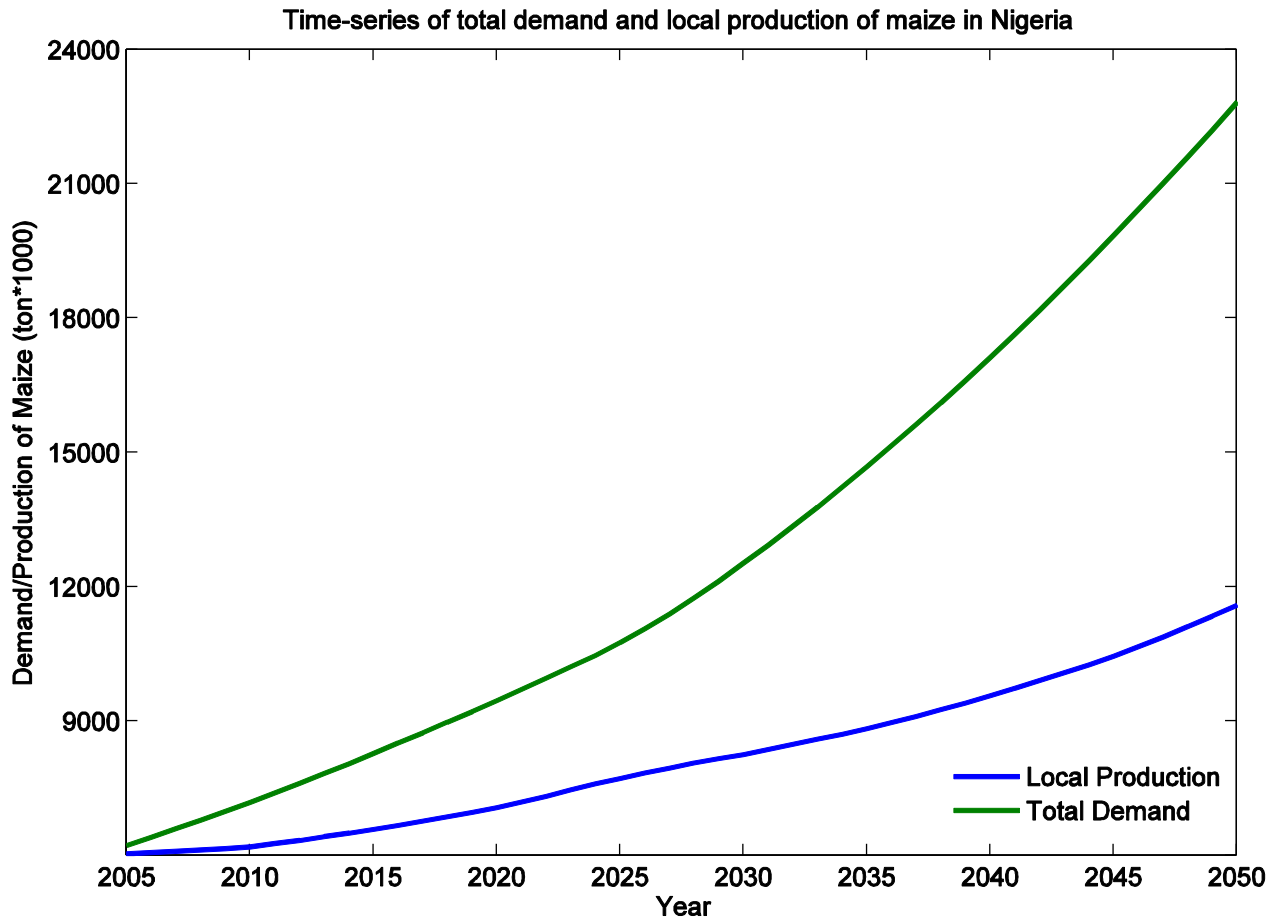
Country	Present-day coverage (%)	Future coverage (%)	
		<i>MIROC-driven climate</i>	<i>CESM-driven climate</i>
Benin	19.17	56.51	60.08
Burkina Faso	20.38	42.96	37.05
Gambia	31.34	76.31	70.57
Ghana	19.12	41.35	52.03
Guinea	6.83	40.27	42.92
Guinea-Bissau	9.42	38.45	41.25
Ivory Coast	13.27	27.65	37.62
Mali	4.97	12	10.88
Niger	13.07	17.79	17.63
Nigeria	39.44	84.46	80.87
Senegal	14.58	45.78	42.28
Sierra Leone	8.7	35.96	39.35
Togo	31.62	51.53	60.85

**Table S2: Future average crop area coverage in the West African countries under the MIROC-driven climate as projected by the LandPro algorithm following three different orders of yield values in selecting the cropping area to optimize agricultural land use. Initial scenario (best case in land use optimization): descending order of yield; alternative scenario 01 (worst case): ascending order; alternative scenario 02 (intermediate case): random order.**

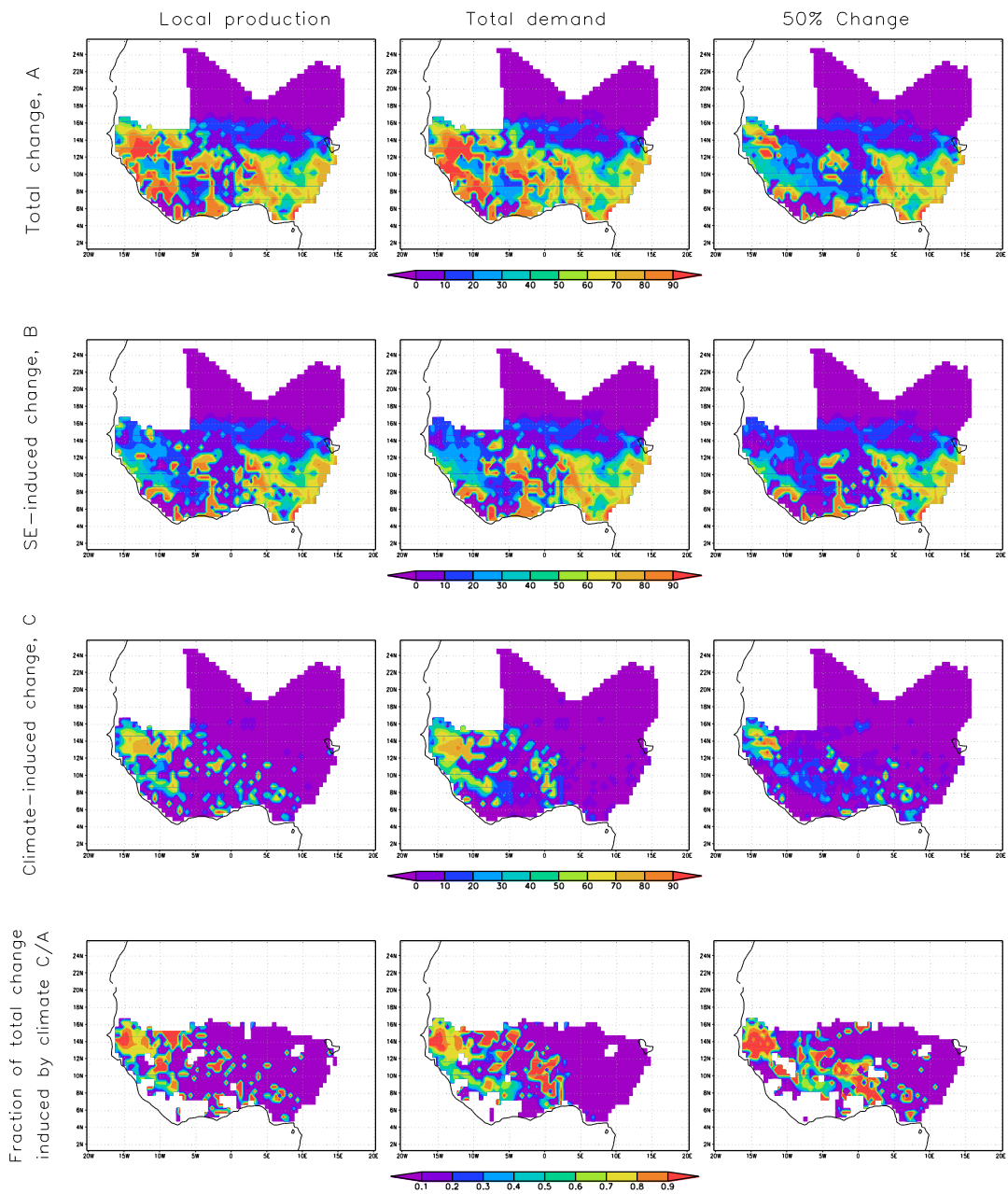
<b>Country</b>	<b>Future coverage (%)</b>		
	<i>Best case</i>	<i>Worst case</i>	<i>Intermediate case</i>
Benin	56.51	74.97	57.22
Burkina Faso	42.96	57.68	52.38
Gambia	76.31	91.45	84.27
Ghana	41.35	56.75	45.92
Guinea	40.27	70.42	47.27
Guinea-Bissau	38.45	80.02	39.41
Ivory Coast	27.65	50.08	29.22
Mali	12.00	22.02	16.36
Niger	17.79	17.81	17.82
Nigeria	84.46	90.36	89.18
Senegal	45.78	81.3	67.93
Sierra Leone	35.96	71.79	39.03
Togo	51.53	73.16	60.14

**Table S3: Future average crop area coverage in the West African countries under the MIROC-driven climate as projected by the LandPro algorithm following four different rankings of crops prioritized by the farmers to optimize agricultural land use. Rank 1: descending order of country-level crop deficit; rank 2: ascending order of country-level crop deficit; rank 3: maize, sorghum, millet, cassava, peanut; rank 4: peanut, cassava, millet, sorghum, maize.**

<b>Country</b>	<b>Future Coverage (%)</b>			
	<i>Rank 1</i>	<i>Rank 2</i>	<i>Rank 3</i>	<i>Rank 4</i>
Benin	56.51	61.15	59.65	58.35
Burkina Faso	42.96	42.5	41.79	43.05
Gambia	76.31	73.06	73.06	79.01
Ghana	41.35	41.81	41.7	42.27
Guinea	40.27	40.29	40.32	39.52
Guinea-Bissau	38.45	38.04	38.03	37.96
Ivory Coast	27.65	27.52	28.38	27.67
Mali	12.00	11.22	11.02	11.96
Niger	17.79	17.75	17.75	17.79
Nigeria	84.46	83.65	83.27	85.91
Senegal	45.78	51.69	49.82	46.57
Sierra Leone	35.96	36.27	36.28	35.95
Togo	51.53	50.93	52.73	53.18



**Figure S1:** Time-series (2005-2050) of total demand and local production of maize in Nigeria according to future projection by the IMPACT model.



**Figure S2:** Sensitivity of land use change pattern to the demand values used as input to LandPro with the alternative cropping scenario following ascending order of yield under the MIROC-driven climate. 1<sup>st</sup> row: absolute magnitude of total change for three future scenarios of demand; 2<sup>nd</sup> row: change due to socioeconomic factors; 3<sup>rd</sup> row: change due to climatic factors; 4<sup>th</sup> row: fraction of climate-induced change to total change.