Supplementary Table S1. Days to maturity of the studied rice cultivars.

Cultivar	Days to Maturity
Sakha101	140
Sakha102	125
Sakha104	135
Sakha107	122
Sakha108	135
Giza177	125
Giza178	135
Giza179	122

Supplementary Table S2: Average minimum temperature, maximum temperature, precipitation, relative humidity, and precipitation on- and off-season of the rice cultivated areas in Egypt during cropping seasons of the study period.

Cropping Year	Minimum temperature (°C)	Maximum temperature (°C)	Average Relative humidity (%)	Average precipitation off-season (mm)	Average precipitation on-season (mm)
2000	16.91	38.75	58.64	15.69	3.31
2001	17.29	37.82	58.98	12.57	0.99
2002	16.90	39.29	58.76	16.07	0.95
2003	18.25	37.26	58.41	12.99	0.04
2004	17.04	37.78	58.76	17.94	0.06
2005	16.54	37.46	58.63	10.03	0.22
2006	16.23	36.21	57.97	15.11	0.30
2007	17.72	38.13	58.54	12.16	0.69
2008	17.07	37.46	57.44	10.91	3.77
2009	16.78	37.90	57.62	9.80	1.51
2010	17.65	36.57	57.83	5.59	0.29
2011	17.31	37.66	57.93	15.18	0.39
2012	18.14	38.50	57.36	14.62	0.68
2013	18.67	35.89	57.49	14.05	0.67
2014	18.42	36.86	57.37	10.46	1.91
2015	17.52	36.98	58.27	21.57	2.80
2016	18.21	37.16	57.87	26.56	3.05
2017	18.06	38.32	57.96	15.01	7.39
2018	19.74	37.48	58.25	0.64	0.07

Source: data collected and averaged from NASA prediction of worldwide energy resources (https://power.larc.nasa.gov/data-access-viewer/)

Supplementary Table S3. Phillips–Perron (PP) unit test results of the rice productivity and the climate change variables.

Variables	L(0)			L(1st)		
	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	None
lnY1	-0.868	-1.023	-0.444	-2.000	-3.204	-1.849**
lnX1	-1.703	-3.057	1.508	-6.479*	-11.422*	-5.909*
lnX2	-4.621*	-4.931*	-0.882	-15.763*	-22.392*	-15.396*
lnX3	-2.191	-2.396	-0.344	-7.218*	-17.051*	-7.184*
lnX4	-2.145	-1.881	-1.215	-3.426**	-3.386	-3.541*
lnX5	-3.373**	-4.078**	-2.567*	-5.340*	-5.029*	-5.598*

Y1: rice crop productivity; X1: minimum temperature; X2: maximum temperature; X3: relative humidity; X4: off-season precipitation and X5: on-season precipitation .Note: ** and *indicate significance at alpha = 0.05, and 0.01, respectively.

Supplementary Table S4. The bounds test for the existence of a long-term relationship between rice productivity and climate factors.

F-statistics	Critical values	I (0) lower bounds	I (1) Upper bounds	Conclusion
5.071	1.0%	3.06	4.15	Cointegration
	2.5%	2.70	3.73	
	5.0%	2.39	3.38	
	10.0%	2.08	3.00	