

Globally Population, Land Agriculture, and Irrigation Methods Data from -10000 to 2050

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Table S1. Global population, Agriculture land, Actual irrigated area, Rain-fed area, Surface irrig., Localized irrig., and Sprinkler irrig.

Years	Total Population in the world (Billion) ^{1,2}	Total Agriculture land (Mha) ³	Actual Irrigated Area (Mha) ^{3,4}	Rain-fed area (Mha) ³	Surface irrigation (Mha) ⁵	Localized irrigation (drip/micro irrigation) (Mha) ^{6,7,8,9}	Sprinkler irrigation (Mha) ¹⁰
-10000	5000000	0					
-9000	6295019	0					
-8000	6538601	10669.0733					
-7000	9370202	2183176.6					
-6000	13704180	16042087.6					
-5000	20390025	42133995.6		5.6			
-4000	31220813	76077710.3	0.95				
-3000	48931074	121104084	1.19				
-2000	77178253	185920240	1.42				
-1000	122846034	268517190	1.9				
0	239920070	440486362					
1			2.61	142			
100	251971629	404535018					
200	251971629	409948043					
300	264410429	396956647					
400	268872633	407988200					
500	273322571	420678319		129			
600	279664140	442068740					
700	292101332	458806020					
800	305152800	483584843					
900	319551387	530208608					

1000	335291843	552484070	4.1	157	
1100	375281848	669302100			
1200	418332474	749798504			
1300	434021668	765472182			
1400	439746634	712851073			
1500	480506023	778592491	4.2	252	
1600	550878347	856158052	4.5		
1700	643618799	962359609	9.3	289	
1710	660949670	977374689			
1720	678813483	1009825287			
1730	697227366	1037031729			
1740	716209013	1068599514			
1750	735776695	1113499843			
1760	767502845	1153548816			
1770	800625995	1196276411			
1780	835209018	1259296328			
1790	871317679	1308619535			
1800	909020776	1347864126	47.5		
1810	955909577	1429908517			
1820	1005302902	1490916264			
1830	1057338216	1581752475			
1840	1112160686	1679871699			
1850	1169923623	1777829375		549	
1860	1245962390	1878343321			
1870	1327318152	1910776316			
1880	1417975804	2085110783			
1890	1519040944	2258722287			
1900	1630171098	2506683804	133.2		
1910	1780008913	2759023199			
1920	1944419089	2940158325			
1930	2124167500	3197901028			
1940	2350947590	3547945952			
1950	2579434878	3835603083			
1960	3030709021	4375774802			
1970	3657420066	4476507303			2000
1974					79320
1978					200,000
1980	4391777096	4592389849			
1981					456799
1986					1,053,824
1990	5219191372	4788955049			

1992							1658357	
1995							1500000- 2000000	
2000	6082966429	4832528655	233					
2001	6173932167	4841551089						
2002	6250016823	4836455067						
2003	6326520742	4828233969						
2004	6403805522	4845256966						
2005	6481944062	4834688507						
2006	6525559210	4834500596						33,000,000
2007	6602274812	4826984331						
2008	6709049780	4831540415						
2009	6788214394	4833225593						
2010	6858584755	4820348579						
2011	6935999491	4838062795						
2012	7013871313	4851886725					10300000	
2013	7092128094	4845002486						
2014	7169968185	4860027699						
2015	7247892788	4864184862	275.6	1316				
2016	7325996709	4873047784			75%		5%	20%
2020	7603000000		333					
2030	8290000000		361					
2040	8892000000		389					
2050	9402000000		414					

Table S2. Fraction of irrigated area by technological category

Year	Micro	Sprinkler	Surface
1940	0.000	0.000	1.000
1941	0.000	0.000	1.000
1942	0.000	0.000	1.000
1943	0.000	0.000	1.000
1944	0.000	0.000	1.000
1945	0.000	0.000	1.000
1946	0.000	0.000	1.000
1947	0.000	0.000	1.000
1948	0.000	0.000	1.000
1949	0.000	0.000	1.000

1950	0.000	0.000	1.000
1951	0.000	0.000	1.000
1952	0.000	0.000	1.000
1953	0.000	0.000	1.000
1954	0.000	0.000	1.000
1955	0.000	0.000	1.000
1956	0.000	0.000	1.000
1957	0.000	0.000	1.000
1958	0.000	0.000	1.000
1959	0.000	0.000	1.000
1960	0.000	0.000	1.000
1961	0.000	0.000	1.000
1962	0.000	0.000	1.000
1963	0.000	0.000	1.000
1964	0.000	0.000	1.000
1965	0.000	0.000	1.000
1966	0.000	0.000	1.000
1967	0.000	0.001	0.999
1968	0.000	0.002	0.998
1969	0.000	0.003	0.997
1970	0.000	0.003	0.997
1971	0.000	0.005	0.995
1972	0.000	0.006	0.994
1973	0.000	0.007	0.993
1974	0.000	0.008	0.991
1975	0.001	0.010	0.989
1976	0.001	0.012	0.988
1977	0.001	0.014	0.986
1978	0.001	0.016	0.983
1979	0.001	0.018	0.981
1980	0.002	0.020	0.978
1981	0.002	0.023	0.975
1982	0.003	0.025	0.972
1983	0.003	0.028	0.969
1984	0.004	0.031	0.965
1985	0.004	0.034	0.962
1986	0.005	0.037	0.958
1987	0.005	0.040	0.954
1988	0.006	0.044	0.950
1989	0.006	0.048	0.946
1990	0.006	0.051	0.942
1991	0.007	0.055	0.938
1992	0.007	0.060	0.933
1993	0.008	0.064	0.928

1994	0.009	0.068	0.923
1995	0.010	0.073	0.918
1996	0.010	0.078	0.912
1997	0.011	0.082	0.906
1998	0.012	0.088	0.900
1999	0.014	0.093	0.894
2000	0.015	0.098	0.887
2001	0.016	0.103	0.880
2002	0.018	0.109	0.873
2003	0.019	0.115	0.866
2004	0.021	0.121	0.858
2005	0.023	0.127	0.850
2006	0.025	0.133	0.842
2007	0.027	0.139	0.834
2008	0.029	0.145	0.826
2009	0.031	0.152	0.817
2010	0.034	0.158	0.808
2011	0.036	0.165	0.799
2012	0.039	0.172	0.789
2013	0.041	0.179	0.780
2014	0.044	0.186	0.770
2015	0.047	0.193	0.760
2016	0.050	0.200	0.750
2020	0.063	0.230	0.708
2030	0.100	0.309	0.591
2040	0.139	0.396	0.465
2050	0.176	0.487	0.337

Scenario description

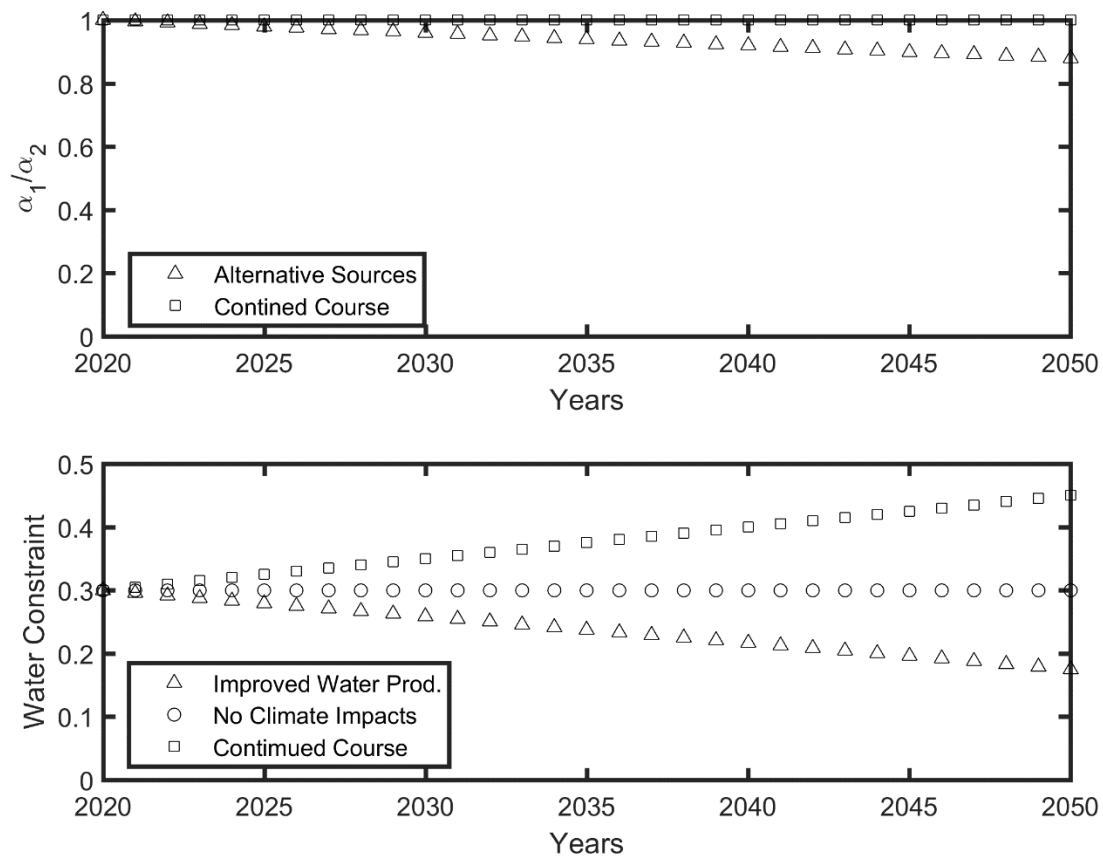


Figure S1. Exogenous parameters that define our scenarios. The alpha ratio incorporates per calorie provisions, food waste, and absolute productivity or rainfed lands. The water constraint is the water sustainability threshold. Additional or reduced per-hectare water demands impact this value. Increased water demand as a result of attempts to mitigate climate impacts would serve to increase this constraint, whilst tactics that increase the water productivity would decrease this constraint.

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