

Table S1. Lists of the 22 CMIP6 GCMs used in this study (Thrasher et al., 2022).

No.	Model Name	Institution / Country
1	ACCESS-CM2	CSIRO-ARCCSS, Australia
2	ACCESS-ESM1-5	CSIRO-ARCCSS, Australia
3	CanESM5	Canadian Centre for Climate Modelling (CCCma), Canada
4	CMCC-CM2-SR5	CMCC, Italy
5	CMCC-ESM2	CMCC, Italy
6	CNRM-CM6-1	CNRM-CERFACS, France
7	CNRM-ESM2-1	CNRM-CERFACS, France
8	EC-Earth3	EC-Earth Consortium
9	EC-Earth3-Veg-LR	EC-Earth Consortium
10	FGOALS-g3	Institute of Atmospheric Physics, CAS, China
11	GFDL-CM4	NOAA GFDL, USA
12	GFDL-ESM4	NOAA GFDL, USA
13	GISS-E2-1-G	NASA Goddard Institute for Space Studies (GISS), USA
14	HadGEM3-GC31-LL	UK Met Office Hadley Centre, UK
15	INM-CM4-8	Institute of Numerical Mathematics (INM), Russia
16	INM-CM5-0	Institute of Numerical Mathematics (INM), Russia
17	KACE-1-0-G	NIMS & KMA, Korea
18	MIROC-ES2L	JAMSTEC, Japan
19	MPI-ESM1-2-HR	Max Planck Institute for Meteorology (MPI), Germany
20	MPI-ESM1-2-LR	Max Planck Institute for Meteorology (MPI), Germany
21	MRI-ESM2-0	Meteorological Research Institute (MRI), Japan
21	NorESM2-MM	Norwegian Climate Centre (NCC), Norway

Table S2. Detailed agricultural drought events by period for SSP2-4.5

Start	End	Duration	Severity	Intensity	Period
02/01/1984	03/01/1984	1	1.221799	1.221799	Baseline (1982-2014)
04/01/1984	06/01/1984	2	3.372725	1.686362	Baseline (1982-2014)
07/01/1984	09/01/1984	2	2.650044	1.325022	Baseline (1982-2014)
10/01/1984	11/01/1984	1	1.385115	1.385115	Baseline (1982-2014)
11/01/1986	12/01/1986	1	1.004434	1.004434	Baseline (1982-2014)
08/01/1990	09/01/1990	1	1.013749	1.013749	Baseline (1982-2014)
10/01/1991	12/01/1991	2	2.65479	1.327395	Baseline (1982-2014)
05/01/1992	06/01/1992	1	1.354598	1.354598	Baseline (1982-2014)
04/01/1993	05/01/1993	1	1.0328	1.0328	Baseline (1982-2014)
10/01/1993	11/01/1993	1	1.047995	1.047995	Baseline (1982-2014)
02/01/1994	03/01/1994	1	1.07106	1.07106	Baseline (1982-2014)
09/01/1994	10/01/1994	1	1.303915	1.303915	Baseline (1982-2014)
03/01/1997	04/01/1997	1	1.203469	1.203469	Baseline (1982-2014)
09/01/1997	10/01/1997	1	1.50553	1.50553	Baseline (1982-2014)
02/01/1999	03/01/1999	1	1.124738	1.124738	Baseline (1982-2014)
05/01/1999	07/01/1999	2	2.791309	1.395654	Baseline (1982-2014)
08/01/1999	09/01/1999	1	1.063296	1.063296	Baseline (1982-2014)

02/01/2000	05/01/2000	3	4.315195	1.438398	Baseline (1982-2014)
06/01/2000	08/01/2000	2	3.194978	1.597489	Baseline (1982-2014)
05/01/2001	06/01/2001	1	1.167456	1.167456	Baseline (1982-2014)
05/01/2002	09/01/2002	4	6.26301	1.565753	Baseline (1982-2014)
10/01/2003	11/01/2003	1	1.241001	1.241001	Baseline (1982-2014)
03/01/2004	04/01/2004	1	1.064379	1.064379	Baseline (1982-2014)
05/01/2004	07/01/2004	2	3.501848	1.750924	Baseline (1982-2014)
08/01/2004	10/01/2004	2	2.59059	1.295295	Baseline (1982-2014)
04/01/2005	05/01/2005	1	1.144689	1.144689	Baseline (1982-2014)
09/01/2005	10/01/2005	1	1.451348	1.451348	Baseline (1982-2014)
12/01/2005	02/01/2006	2	2.095514	1.047757	Baseline (1982-2014)
03/01/2008	04/01/2008	1	1.189075	1.189075	Baseline (1982-2014)
05/01/2008	06/01/2008	1	1.330396	1.330396	Baseline (1982-2014)
06/01/2009	10/01/2009	4	6.662231	1.665558	Baseline (1982-2014)
10/01/2010	11/01/2010	1	1.001022	1.001022	Baseline (1982-2014)
02/01/2012	03/01/2012	1	1.220437	1.220437	Baseline (1982-2014)
09/01/2028	10/01/2028	1	1.043639	1.043639	Near Future (2015-2040)
05/01/2037	06/01/2037	1	1.094869	1.094869	Near Future (2015-2040)
07/01/2054	08/01/2054	1	1.047683	1.047683	Mid Future (2041-2074)
07/01/2056	08/01/2056	1	1.04812	1.04812	Mid Future (2041-2074)

05/01/2059	06/01/2059	1	1.053118	1.053118	Mid Future (2041-2074)
05/01/2061	06/01/2061	1	1.144435	1.144435	Mid Future (2041-2074)
07/01/2061	08/01/2061	1	1.441452	1.441452	Mid Future (2041-2074)
06/01/2062	08/01/2062	2	2.216206	1.108103	Mid Future (2041-2074)
05/01/2063	07/01/2063	2	2.034703	1.017352	Mid Future (2041-2074)
05/01/2065	06/01/2065	1	1.277593	1.277593	Mid Future (2041-2074)
05/01/2066	06/01/2066	1	1.136204	1.136204	Mid Future (2041-2074)
07/01/2066	08/01/2066	1	1.248651	1.248651	Mid Future (2041-2074)
05/01/2067	06/01/2067	1	1.210634	1.210634	Mid Future (2041-2074)
07/01/2067	08/01/2067	1	1.165812	1.165812	Mid Future (2041-2074)
05/01/2070	06/01/2070	1	1.16479	1.16479	Mid Future (2041-2074)
05/01/2071	06/01/2071	1	1.24746	1.24746	Mid Future (2041-2074)
05/01/2072	06/01/2072	1	1.152816	1.152816	Mid Future (2041-2074)
07/01/2072	08/01/2072	1	1.212804	1.212804	Mid Future (2041-2074)
06/01/2073	07/01/2073	1	1.099748	1.099748	Mid Future (2041-2074)
05/01/2074	06/01/2074	1	1.214805	1.214805	Mid Future (2041-2074)
07/01/2074	08/01/2074	1	1.280299	1.280299	Mid Future (2041-2074)
05/01/2075	06/01/2075	1	1.173091	1.173091	Far Future (2075-2100)
06/01/2076	07/01/2076	1	1.194517	1.194517	Far Future (2075-2100)
05/01/2077	08/01/2077	3	3.77539	1.258463	Far Future (2075-2100)

05/01/2078	06/01/2078	1	1.149279	1.149279	Far Future (2075-2100)
05/01/2080	06/01/2080	1	1.018447	1.018447	Far Future (2075-2100)
06/01/2082	08/01/2082	2	2.745448	1.372724	Far Future (2075-2100)
07/01/2083	08/01/2083	1	1.205416	1.205416	Far Future (2075-2100)
05/01/2085	08/01/2085	3	3.565058	1.188353	Far Future (2075-2100)
05/01/2086	06/01/2086	1	1.002458	1.002458	Far Future (2075-2100)
06/01/2088	08/01/2088	2	2.29845	1.149225	Far Future (2075-2100)
06/01/2089	07/01/2089	1	1.262988	1.262988	Far Future (2075-2100)
06/01/2090	07/01/2090	1	1.187731	1.187731	Far Future (2075-2100)
05/01/2091	06/01/2091	1	1.249552	1.249552	Far Future (2075-2100)
05/01/2092	06/01/2092	1	1.271321	1.271321	Far Future (2075-2100)
07/01/2093	08/01/2093	1	1.051216	1.051216	Far Future (2075-2100)
07/01/2094	08/01/2094	1	1.292944	1.292944	Far Future (2075-2100)
05/01/2097	06/01/2097	1	1.229044	1.229044	Far Future (2075-2100)
05/01/2098	06/01/2098	1	1.153156	1.153156	Far Future (2075-2100)
07/01/2098	08/01/2098	1	1.361652	1.361652	Far Future (2075-2100)

Table S2 presents the major drought events identified in the study area across historical and projected periods. Each event is characterized by its start and end dates, duration (in months), severity (cumulative deficit), and intensity (severity per unit time). The period column indicates whether the event occurred in the historical baseline, near future, mid-century, or far-future horizon.

Table S3. Detailed agricultural drought events by period for SSP5-8.5

Start	End	Duration	Severity	Intensity	Period
01/02/1984	01/03/1984	1	1.221799	1.221799	Baseline (1982-2014)
01/04/1984	01/05/1984	1	1.353013	1.353013	Baseline (1982-2014)
01/07/1984	01/09/1984	2	2.650044	1.325022	Baseline (1982-2014)
01/10/1984	01/11/1984	1	1.385115	1.385115	Baseline (1982-2014)
01/11/1986	01/12/1986	1	1.004434	1.004434	Baseline (1982-2014)
01/08/1990	01/09/1990	1	1.013749	1.013749	Baseline (1982-2014)
01/10/1991	01/12/1991	2	2.65479	1.327395	Baseline (1982-2014)
01/05/1992	01/06/1992	1	1.354598	1.354598	Baseline (1982-2014)
01/04/1993	01/05/1993	1	1.0328	1.0328	Baseline (1982-2014)
01/10/1993	01/11/1993	1	1.047995	1.047995	Baseline (1982-2014)
01/02/1994	01/03/1994	1	1.07106	1.07106	Baseline (1982-2014)
01/09/1994	01/10/1994	1	1.303915	1.303915	Baseline (1982-2014)
01/03/1997	01/04/1997	1	1.203469	1.203469	Baseline (1982-2014)
01/09/1997	01/10/1997	1	1.50553	1.50553	Baseline (1982-2014)

01/02/1999	01/03/1999	1	1.124738	1.124738	Baseline (1982-2014)
01/05/1999	01/07/1999	2	2.791309	1.395654	Baseline (1982-2014)
01/08/1999	01/09/1999	1	1.063296	1.063296	Baseline (1982-2014)
01/02/2000	01/05/2000	3	4.315195	1.438398	Baseline (1982-2014)
01/06/2000	01/08/2000	2	3.194978	1.597489	Baseline (1982-2014)
01/05/2001	01/06/2001	1	1.167456	1.167456	Baseline (1982-2014)
01/05/2002	01/08/2002	3	4.132481	1.377494	Baseline (1982-2014)
01/10/2003	01/11/2003	1	1.241001	1.241001	Baseline (1982-2014)
01/03/2004	01/04/2004	1	1.064379	1.064379	Baseline (1982-2014)
01/06/2004	01/07/2004	1	1.570752	1.570752	Baseline (1982-2014)
01/08/2004	01/10/2004	2	2.59059	1.295295	Baseline (1982-2014)
01/04/2005	01/05/2005	1	1.144689	1.144689	Baseline (1982-2014)
01/09/2005	01/10/2005	1	1.451348	1.451348	Baseline (1982-2014)
01/12/2005	01/02/2006	2	2.095514	1.047757	Baseline (1982-2014)
01/03/2008	01/04/2008	1	1.189075	1.189075	Baseline (1982-2014)
01/05/2008	01/06/2008	1	1.330396	1.330396	Baseline (1982-2014)
01/06/2009	01/08/2009	2	3.141127	1.570563	Baseline (1982-2014)
01/09/2009	01/10/2009	1	1.483678	1.483678	Baseline (1982-2014)
01/10/2010	01/11/2010	1	1.001022	1.001022	Baseline (1982-2014)
01/02/2012	01/03/2012	1	1.220437	1.220437	Baseline (1982-2014)

01/09/2041	01/10/2041	1	1.157839	1.157839	Mid Future (2041-2074)
01/05/2048	01/06/2048	1	1.013665	1.013665	Mid Future (2041-2074)
01/06/2059	01/07/2059	1	1.005357	1.005357	Mid Future (2041-2074)
01/09/2061	01/10/2061	1	1.271635	1.271635	Mid Future (2041-2074)
01/07/2064	01/08/2064	1	1.227423	1.227423	Mid Future (2041-2074)
01/05/2065	01/06/2065	1	1.023181	1.023181	Mid Future (2041-2074)
01/07/2069	01/08/2069	1	1.244837	1.244837	Mid Future (2041-2074)
01/07/2070	01/08/2070	1	1.027417	1.027417	Mid Future (2041-2074)
01/05/2071	01/06/2071	1	1.193274	1.193274	Mid Future (2041-2074)
01/07/2074	01/08/2074	1	1.005383	1.005383	Mid Future (2041-2074)
01/07/2076	01/08/2076	1	1.413822	1.413822	Far Future (2075-2100)
01/07/2078	01/08/2078	1	1.372381	1.372381	Far Future (2075-2100)
01/07/2080	01/08/2080	1	1.232499	1.232499	Far Future (2075-2100)
01/07/2083	01/08/2083	1	1.196842	1.196842	Far Future (2075-2100)
01/07/2084	01/08/2084	1	1.136058	1.136058	Far Future (2075-2100)
01/05/2085	01/07/2085	2	2.221513	1.110757	Far Future (2075-2100)
01/07/2087	01/08/2087	1	1.469138	1.469138	Far Future (2075-2100)
01/05/2088	01/06/2088	1	1.269314	1.269314	Far Future (2075-2100)
01/07/2088	01/08/2088	1	1.293808	1.293808	Far Future (2075-2100)
01/07/2090	01/08/2090	1	1.2404	1.2404	Far Future (2075-2100)

01/05/2092	01/07/2092	2	2.147541	1.073771	Far Future (2075-2100)
01/06/2093	01/08/2093	2	2.088693	1.044346	Far Future (2075-2100)
01/05/2095	01/06/2095	1	1.164865	1.164865	Far Future (2075-2100)
01/07/2095	01/08/2095	1	1.022698	1.022698	Far Future (2075-2100)
01/07/2097	01/08/2097	1	1.136244	1.136244	Far Future (2075-2100)
01/05/2099	01/06/2099	1	1.07669	1.07669	Far Future (2075-2100)

Table S3 presents the major drought events identified in the study area across historical and projected periods. Each event is characterized by its start and end dates, duration (in months), severity (cumulative deficit), and intensity (severity per unit time). The period column indicates whether the event occurred in the historical baseline, near future, mid-century, or far-future horizon.

Table S4. Detailed hydrological drought events by period for SSP2-4.5

Start	End	Duration	Severity	Intensity	Period
01/01/1982	04/01/1982	3	3.466831	1.1556103	Baseline (1982-2014)
01/01/1983	04/01/1983	3	3.18226	1.0607532	Baseline (1982-2014)
01/01/1984	04/01/1984	3	3.733152	1.2443841	Baseline (1982-2014)
12/01/1984	03/01/1985	3	3.601088	1.2003625	Baseline (1982-2014)
01/01/1986	04/01/1986	3	3.434175	1.1447249	Baseline (1982-2014)
01/01/1987	03/01/1987	2	2.41355	1.2067751	Baseline (1982-2014)
01/01/1988	04/01/1988	3	3.411071	1.1370237	Baseline (1982-2014)

12/01/1988	03/01/1989	3	3.485691	1.161897	Baseline (1982-2014)
01/01/1991	03/01/1991	2	2.354732	1.1773658	Baseline (1982-2014)
12/01/1991	04/01/1992	4	4.924937	1.2312341	Baseline (1982-2014)
03/01/1993	04/01/1993	1	1.205738	1.2057375	Baseline (1982-2014)
12/01/1993	04/01/1994	4	4.990274	1.2475686	Baseline (1982-2014)
01/01/1995	03/01/1995	2	2.424324	1.2121622	Baseline (1982-2014)
01/01/1996	03/01/1996	2	2.384518	1.192259	Baseline (1982-2014)
12/01/1996	04/01/1997	4	4.66754	1.166885	Baseline (1982-2014)
12/01/1998	03/01/1999	3	3.664228	1.2214092	Baseline (1982-2014)
12/01/1999	04/01/2000	4	5.087512	1.271878	Baseline (1982-2014)
12/01/2000	03/01/2001	3	3.524741	1.1749137	Baseline (1982-2014)
12/01/2001	03/01/2002	3	3.461098	1.1536992	Baseline (1982-2014)
01/01/2003	04/01/2003	3	3.354368	1.1181225	Baseline (1982-2014)
01/01/2004	04/01/2004	3	3.493874	1.1646248	Baseline (1982-2014)
01/01/2005	03/01/2005	2	2.479091	1.2395454	Baseline (1982-2014)
12/01/2005	03/01/2006	3	3.509448	1.1698159	Baseline (1982-2014)
02/01/2007	04/01/2007	2	2.257546	1.1287732	Baseline (1982-2014)
12/01/2007	04/01/2008	4	5.019556	1.254889	Baseline (1982-2014)
12/01/2008	04/01/2009	4	4.805277	1.2013192	Baseline (1982-2014)
01/01/2010	02/01/2010	1	1.123909	1.1239086	Baseline (1982-2014)

12/01/2010	04/01/2011	4	5.034555	1.2586388	Baseline (1982-2014)
01/01/2012	04/01/2012	3	3.848847	1.2829489	Baseline (1982-2014)
01/01/2013	03/01/2013	2	2.425937	1.2129683	Baseline (1982-2014)
01/01/2014	03/01/2014	2	2.394346	1.1971729	Baseline (1982-2014)
01/01/2015	03/01/2015	2	2.21466	1.1073299	Near Future (2015-2040)
01/01/2016	03/01/2016	2	2.147944	1.073972	Near Future (2015-2040)
12/01/2016	03/01/2017	3	3.420771	1.1402569	Near Future (2015-2040)
01/01/2018	03/01/2018	2	2.450797	1.2253984	Near Future (2015-2040)
01/01/2019	03/01/2019	2	2.249985	1.1249924	Near Future (2015-2040)
01/01/2020	03/01/2020	2	2.430808	1.2154039	Near Future (2015-2040)
01/01/2021	03/01/2021	2	2.405818	1.2029088	Near Future (2015-2040)
01/01/2022	03/01/2022	2	2.16095	1.0804752	Near Future (2015-2040)
01/01/2023	03/01/2023	2	2.366703	1.1833516	Near Future (2015-2040)
01/01/2024	02/01/2024	1	1.174968	1.1749675	Near Future (2015-2040)
01/01/2025	04/01/2025	3	3.372601	1.1242003	Near Future (2015-2040)
02/01/2026	04/01/2026	2	2.240398	1.1201992	Near Future (2015-2040)
12/01/2026	03/01/2027	3	3.423217	1.1410724	Near Future (2015-2040)
01/01/2028	02/01/2028	1	1.053112	1.0531121	Near Future (2015-2040)
01/01/2029	03/01/2029	2	2.261117	1.1305583	Near Future (2015-2040)
01/01/2030	03/01/2030	2	2.433124	1.2165618	Near Future (2015-2040)

01/01/2031	03/01/2031	2	2.262586	1.131293	Near Future (2015-2040)
12/01/2031	03/01/2032	3	3.252684	1.0842279	Near Future (2015-2040)
01/01/2033	03/01/2033	2	2.211509	1.1057547	Near Future (2015-2040)
12/01/2033	04/01/2034	4	4.619326	1.1548314	Near Future (2015-2040)
02/01/2035	03/01/2035	1	1.219041	1.2190412	Near Future (2015-2040)
01/01/2036	03/01/2036	2	2.373521	1.1867607	Near Future (2015-2040)
12/01/2036	03/01/2037	3	3.560213	1.1867376	Near Future (2015-2040)
01/01/2038	03/01/2038	2	2.43298	1.2164898	Near Future (2015-2040)
02/01/2039	03/01/2039	1	1.228139	1.2281385	Near Future (2015-2040)
01/01/2040	03/01/2040	2	2.407482	1.2037408	Near Future (2015-2040)
01/01/2041	04/01/2041	3	3.356148	1.1187159	Mid Future (2041-2074)
12/01/2041	03/01/2042	3	3.428446	1.1428153	Mid Future (2041-2074)
12/01/2042	01/01/2043	1	1.025911	1.0259111	Mid Future (2041-2074)
02/01/2043	03/01/2043	1	1.194431	1.1944312	Mid Future (2041-2074)
01/01/2044	04/01/2044	3	3.328721	1.1095735	Mid Future (2041-2074)
12/01/2044	04/01/2045	4	4.454371	1.1135928	Mid Future (2041-2074)
12/01/2045	03/01/2046	3	3.49544	1.1651466	Mid Future (2041-2074)
01/01/2047	04/01/2047	3	3.448563	1.1495211	Mid Future (2041-2074)
12/01/2047	03/01/2048	3	3.44393	1.1479766	Mid Future (2041-2074)
01/01/2049	04/01/2049	3	3.268888	1.0896292	Mid Future (2041-2074)

02/01/2050	04/01/2050	2	2.28781	1.1439051	Mid Future (2041-2074)
12/01/2050	04/01/2051	4	4.519759	1.1299397	Mid Future (2041-2074)
12/01/2051	03/01/2052	3	3.365176	1.1217254	Mid Future (2041-2074)
02/01/2053	03/01/2053	1	1.21603	1.2160296	Mid Future (2041-2074)
01/01/2054	03/01/2054	2	2.181353	1.0906764	Mid Future (2041-2074)
02/01/2055	03/01/2055	1	1.11665	1.1166497	Mid Future (2041-2074)
01/01/2056	03/01/2056	2	2.361656	1.1808278	Mid Future (2041-2074)
01/01/2057	03/01/2057	2	2.29498	1.1474899	Mid Future (2041-2074)
01/01/2058	03/01/2058	2	2.389417	1.1947086	Mid Future (2041-2074)
01/01/2059	04/01/2059	3	3.442725	1.1475749	Mid Future (2041-2074)
03/01/2060	04/01/2060	1	1.009202	1.0092019	Mid Future (2041-2074)
12/01/2060	03/01/2061	3	3.443144	1.1477147	Mid Future (2041-2074)
12/01/2061	04/01/2062	4	4.610058	1.1525144	Mid Future (2041-2074)
01/01/2063	04/01/2063	3	3.10072	1.0335735	Mid Future (2041-2074)
01/01/2064	04/01/2064	3	3.509638	1.1698795	Mid Future (2041-2074)
12/01/2064	04/01/2065	4	4.539357	1.1348393	Mid Future (2041-2074)
01/01/2066	03/01/2066	2	2.361401	1.1807004	Mid Future (2041-2074)
12/01/2066	04/01/2067	4	4.433199	1.1082997	Mid Future (2041-2074)
01/01/2068	03/01/2068	2	2.245264	1.1226321	Mid Future (2041-2074)
12/01/2068	03/01/2069	3	3.435685	1.1452282	Mid Future (2041-2074)

01/01/2070	03/01/2070	2	2.274705	1.1373525	Mid Future (2041-2074)
03/01/2071	04/01/2071	1	1.09284	1.0928395	Mid Future (2041-2074)
12/01/2071	03/01/2072	3	3.44657	1.1488565	Mid Future (2041-2074)
02/01/2073	04/01/2073	2	2.273596	1.1367982	Mid Future (2041-2074)
12/01/2073	03/01/2074	3	3.333558	1.111186	Mid Future (2041-2074)
01/01/2075	03/01/2075	2	2.372503	1.1862516	Far Future (2075-2100)
01/01/2076	04/01/2076	3	3.502992	1.1676641	Far Future (2075-2100)
01/01/2077	04/01/2077	3	3.417206	1.1390686	Far Future (2075-2100)
12/01/2077	03/01/2078	3	3.315392	1.1051308	Far Future (2075-2100)
01/01/2079	03/01/2079	2	2.101173	1.0505867	Far Future (2075-2100)
02/01/2080	03/01/2080	1	1.114554	1.1145537	Far Future (2075-2100)
12/01/2080	04/01/2081	4	4.28626	1.0715649	Far Future (2075-2100)
12/01/2081	03/01/2082	3	3.4791	1.1596999	Far Future (2075-2100)
12/01/2082	03/01/2083	3	3.545836	1.1819454	Far Future (2075-2100)
01/01/2084	03/01/2084	2	2.219756	1.1098778	Far Future (2075-2100)
12/01/2084	04/01/2085	4	4.382953	1.0957381	Far Future (2075-2100)
02/01/2086	04/01/2086	2	2.256986	1.1284931	Far Future (2075-2100)
12/01/2086	04/01/2087	4	4.444981	1.1112454	Far Future (2075-2100)
12/01/2087	03/01/2088	3	3.213316	1.0711055	Far Future (2075-2100)
12/01/2088	01/01/2089	1	1.061302	1.0613018	Far Future (2075-2100)

02/01/2089	03/01/2089	1	1.219951	1.2199513	Far Future (2075-2100)
02/01/2090	03/01/2090	1	1.113273	1.1132733	Far Future (2075-2100)
12/01/2090	04/01/2091	4	4.56986	1.1424649	Far Future (2075-2100)
12/01/2091	03/01/2092	3	3.354691	1.1182304	Far Future (2075-2100)
01/01/2093	03/01/2093	2	2.179644	1.0898221	Far Future (2075-2100)
12/01/2093	04/01/2094	4	4.595948	1.148987	Far Future (2075-2100)
12/01/2094	04/01/2095	4	4.474772	1.1186931	Far Future (2075-2100)
03/01/2096	04/01/2096	1	1.100858	1.1008584	Far Future (2075-2100)
12/01/2096	04/01/2097	4	4.62795	1.1569876	Far Future (2075-2100)
01/01/2098	03/01/2098	2	2.294928	1.1474638	Far Future (2075-2100)
12/01/2098	04/01/2099	4	4.445625	1.1114062	Far Future (2075-2100)

Table S4 presents the major drought events identified in the study area across historical and projected periods. Each event is characterized by its start and end dates, duration (in months), severity (cumulative deficit), and intensity (severity per unit time). The period column indicates whether the event occurred in the historical baseline, near future, mid-century, or far-future horizon.

Table S5. Detailed hydrological drought events by period for SSP5-8.5

Start	End	Duration	Severity	Intensity	Period
01/01/1982	04/01/1982	3	3.466831	1.15561	Baseline (1982-2014)
01/01/1983	04/01/1983	3	3.18226	1.060753	Baseline (1982-2014)

01/01/1984	04/01/1984	3	3.733152	1.244384	Baseline (1982-2014)
12/01/1984	03/01/1985	3	3.601088	1.200363	Baseline (1982-2014)
01/01/1986	04/01/1986	3	3.434175	1.144725	Baseline (1982-2014)
01/01/1987	03/01/1987	2	2.41355	1.206775	Baseline (1982-2014)
01/01/1988	04/01/1988	3	3.411071	1.137024	Baseline (1982-2014)
12/01/1988	03/01/1989	3	3.485691	1.161897	Baseline (1982-2014)
01/01/1991	03/01/1991	2	2.354732	1.177366	Baseline (1982-2014)
12/01/1991	04/01/1992	4	4.924937	1.231234	Baseline (1982-2014)
03/01/1993	04/01/1993	1	1.205738	1.205738	Baseline (1982-2014)
12/01/1993	04/01/1994	4	4.990274	1.247569	Baseline (1982-2014)
01/01/1995	03/01/1995	2	2.424324	1.212162	Baseline (1982-2014)
01/01/1996	03/01/1996	2	2.384518	1.192259	Baseline (1982-2014)
12/01/1996	04/01/1997	4	4.66754	1.166885	Baseline (1982-2014)
12/01/1998	03/01/1999	3	3.664228	1.221409	Baseline (1982-2014)
12/01/1999	04/01/2000	4	5.087512	1.271878	Baseline (1982-2014)
12/01/2000	03/01/2001	3	3.524741	1.174914	Baseline (1982-2014)
12/01/2001	03/01/2002	3	3.461098	1.153699	Baseline (1982-2014)
01/01/2003	04/01/2003	3	3.354368	1.118123	Baseline (1982-2014)
01/01/2004	04/01/2004	3	3.493874	1.164625	Baseline (1982-2014)
01/01/2005	03/01/2005	2	2.479091	1.239545	Baseline (1982-2014)

12/01/2005	03/01/2006	3	3.509448	1.169816	Baseline (1982-2014)
02/01/2007	04/01/2007	2	2.257546	1.128773	Baseline (1982-2014)
12/01/2007	04/01/2008	4	5.019556	1.254889	Baseline (1982-2014)
12/01/2008	04/01/2009	4	4.805277	1.201319	Baseline (1982-2014)
01/01/2010	02/01/2010	1	1.123909	1.123909	Baseline (1982-2014)
12/01/2010	04/01/2011	4	5.034555	1.258639	Baseline (1982-2014)
01/01/2012	04/01/2012	3	3.848847	1.282949	Baseline (1982-2014)
01/01/2013	03/01/2013	2	2.425937	1.212968	Baseline (1982-2014)
01/01/2014	03/01/2014	2	2.394346	1.197173	Baseline (1982-2014)
01/01/2015	03/01/2015	2	2.263695	1.131848	Near Future (2015-2040)
01/01/2016	03/01/2016	2	2.460464	1.230232	Near Future (2015-2040)
01/01/2017	04/01/2017	3	3.243526	1.081175	Near Future (2015-2040)
01/01/2018	03/01/2018	2	2.244378	1.122189	Near Future (2015-2040)
02/01/2019	03/01/2019	1	1.256906	1.256906	Near Future (2015-2040)
01/01/2020	03/01/2020	2	2.344374	1.172187	Near Future (2015-2040)
01/01/2021	03/01/2021	2	2.335848	1.167924	Near Future (2015-2040)
01/01/2022	04/01/2022	3	3.458058	1.152686	Near Future (2015-2040)
01/01/2023	04/01/2023	3	3.436796	1.145599	Near Future (2015-2040)
01/01/2024	03/01/2024	2	2.252674	1.126337	Near Future (2015-2040)
12/01/2024	03/01/2025	3	3.332275	1.110758	Near Future (2015-2040)

02/01/2026	03/01/2026	1	1.071849	1.071849	Near Future (2015-2040)
12/01/2026	03/01/2027	3	3.471448	1.157149	Near Future (2015-2040)
01/01/2028	03/01/2028	2	2.267024	1.133512	Near Future (2015-2040)
01/01/2029	02/01/2029	1	1.139236	1.139236	Near Future (2015-2040)
01/01/2030	03/01/2030	2	2.316539	1.158269	Near Future (2015-2040)
01/01/2031	03/01/2031	2	2.255424	1.127712	Near Future (2015-2040)
12/01/2031	03/01/2032	3	3.64982	1.216607	Near Future (2015-2040)
01/01/2033	03/01/2033	2	2.478426	1.239213	Near Future (2015-2040)
12/01/2033	03/01/2034	3	3.391249	1.130416	Near Future (2015-2040)
01/01/2035	03/01/2035	2	2.334059	1.167029	Near Future (2015-2040)
02/01/2036	03/01/2036	1	1.067029	1.067029	Near Future (2015-2040)
01/01/2037	03/01/2037	2	2.155375	1.077687	Near Future (2015-2040)
01/01/2038	03/01/2038	2	2.323269	1.161635	Near Future (2015-2040)
12/01/2038	03/01/2039	3	3.450986	1.150329	Near Future (2015-2040)
02/01/2040	03/01/2040	1	1.147703	1.147703	Near Future (2015-2040)
01/01/2041	04/01/2041	3	3.31803	1.10601	Mid Future (2041-2074)
01/01/2042	04/01/2042	3	3.413672	1.137891	Mid Future (2041-2074)
12/01/2042	04/01/2043	4	4.575919	1.14398	Mid Future (2041-2074)
01/01/2044	03/01/2044	2	2.355892	1.177946	Mid Future (2041-2074)
12/01/2044	04/01/2045	4	4.478644	1.119661	Mid Future (2041-2074)

01/01/2046	04/01/2046	3	3.477829	1.159276	Mid Future (2041-2074)
12/01/2046	04/01/2047	4	4.501233	1.125308	Mid Future (2041-2074)
12/01/2047	03/01/2048	3	3.443321	1.147774	Mid Future (2041-2074)
02/01/2049	03/01/2049	1	1.221838	1.221838	Mid Future (2041-2074)
01/01/2050	04/01/2050	3	3.239034	1.079678	Mid Future (2041-2074)
12/01/2050	04/01/2051	4	4.499574	1.124893	Mid Future (2041-2074)
02/01/2052	03/01/2052	1	1.094672	1.094672	Mid Future (2041-2074)
12/01/2052	03/01/2053	3	3.579518	1.193173	Mid Future (2041-2074)
12/01/2053	01/01/2054	1	1.118133	1.118133	Mid Future (2041-2074)
02/01/2054	04/01/2054	2	2.420135	1.210067	Mid Future (2041-2074)
01/01/2055	04/01/2055	3	3.461501	1.153834	Mid Future (2041-2074)
01/01/2056	03/01/2056	2	2.298232	1.149116	Mid Future (2041-2074)
01/01/2057	03/01/2057	2	2.054985	1.027493	Mid Future (2041-2074)
02/01/2058	03/01/2058	1	1.180356	1.180356	Mid Future (2041-2074)
01/01/2059	03/01/2059	2	2.355007	1.177503	Mid Future (2041-2074)
01/01/2060	02/01/2060	1	1.178096	1.178096	Mid Future (2041-2074)
12/01/2060	04/01/2061	4	4.493301	1.123325	Mid Future (2041-2074)
01/01/2062	04/01/2062	3	3.164483	1.054828	Mid Future (2041-2074)
01/01/2063	04/01/2063	3	3.261009	1.087003	Mid Future (2041-2074)
01/01/2064	04/01/2064	3	3.431973	1.143991	Mid Future (2041-2074)

01/01/2065	03/01/2065	2	2.286763	1.143381	Mid Future (2041-2074)
01/01/2066	04/01/2066	3	3.374985	1.124995	Mid Future (2041-2074)
02/01/2067	04/01/2067	2	2.284138	1.142069	Mid Future (2041-2074)
01/01/2068	03/01/2068	2	2.280682	1.140341	Mid Future (2041-2074)
12/01/2068	03/01/2069	3	3.36791	1.122637	Mid Future (2041-2074)
12/01/2069	04/01/2070	4	4.546913	1.136728	Mid Future (2041-2074)
12/01/2070	01/01/2071	1	1.001413	1.001413	Mid Future (2041-2074)
02/01/2071	03/01/2071	1	1.099395	1.099395	Mid Future (2041-2074)
02/01/2072	04/01/2072	2	2.129383	1.064692	Mid Future (2041-2074)
01/01/2073	04/01/2073	3	3.307995	1.102665	Mid Future (2041-2074)
12/01/2073	04/01/2074	4	4.714749	1.178687	Mid Future (2041-2074)
01/01/2076	03/01/2076	2	2.349335	1.174668	Far Future (2075-2100)
12/01/2076	01/01/2077	1	1.027908	1.027908	Far Future (2075-2100)
02/01/2077	03/01/2077	1	1.095056	1.095056	Far Future (2075-2100)
12/01/2077	04/01/2078	4	4.529775	1.132444	Far Future (2075-2100)
02/01/2079	03/01/2079	1	1.159903	1.159903	Far Future (2075-2100)
01/01/2080	03/01/2080	2	2.329277	1.164639	Far Future (2075-2100)
12/01/2080	01/01/2081	1	1.105719	1.105719	Far Future (2075-2100)
02/01/2081	03/01/2081	1	1.095666	1.095666	Far Future (2075-2100)
12/01/2081	01/01/2082	1	1.029054	1.029054	Far Future (2075-2100)

02/01/2082	03/01/2082	1	1.273235	1.273235	Far Future (2075-2100)
01/01/2083	03/01/2083	2	2.445419	1.22271	Far Future (2075-2100)
12/01/2083	01/01/2084	1	1.012083	1.012083	Far Future (2075-2100)
02/01/2084	03/01/2084	1	1.141226	1.141226	Far Future (2075-2100)
01/01/2085	04/01/2085	3	3.239852	1.079951	Far Future (2075-2100)
02/01/2086	03/01/2086	1	1.184363	1.184363	Far Future (2075-2100)
12/01/2086	01/01/2087	1	1.084496	1.084496	Far Future (2075-2100)
02/01/2087	03/01/2087	1	1.112042	1.112042	Far Future (2075-2100)
12/01/2087	03/01/2088	3	3.186724	1.062241	Far Future (2075-2100)
01/01/2089	03/01/2089	2	2.305482	1.152741	Far Future (2075-2100)
12/01/2089	01/01/2090	1	1.018481	1.018481	Far Future (2075-2100)
02/01/2090	03/01/2090	1	1.129598	1.129598	Far Future (2075-2100)
02/01/2091	03/01/2091	1	1.171749	1.171749	Far Future (2075-2100)
12/01/2091	01/01/2092	1	1.096006	1.096006	Far Future (2075-2100)
02/01/2092	03/01/2092	1	1.084237	1.084237	Far Future (2075-2100)
01/01/2093	03/01/2093	2	2.253438	1.126719	Far Future (2075-2100)
12/01/2093	01/01/2094	1	1.071282	1.071282	Far Future (2075-2100)
02/01/2094	03/01/2094	1	1.097056	1.097056	Far Future (2075-2100)
02/01/2095	03/01/2095	1	1.132757	1.132757	Far Future (2075-2100)
01/01/2096	03/01/2096	2	2.296913	1.148457	Far Future (2075-2100)

02/01/2098	03/01/2098	1	1.225371	1.225371	Far Future (2075-2100)
12/01/2098	03/01/2099	3	3.250592	1.083531	Far Future (2075-2100)

Table S5 presents the major drought events identified in the study area across historical and projected periods. Each event is characterized by its start and end dates, duration (in months), severity (cumulative deficit), and intensity (severity per unit time). The period column indicates whether the event occurred in the historical baseline, near future, mid-century, or far-future horizon.