

Supplemental Material for Global Famine after Nuclear War

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Table S1. Calorie reduction (%) from the major food crops (maize, rice, soybean and spring wheat) and marine fish averaged over the first five years after simulated nuclear conflicts for the nations with nuclear weapons and the global average for all nations calculated.

Nations	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
China	-13.2	-38.5	-59.0	-71.1	-79.3	-97.2
France	-3.5	-16.5	-30.1	-29.5	-41.8	-97.5
India	-4.4	-5.5	-9.0	-14.7	-22.5	-57.2
Israel	2.6	-0.1	-5.9	-7.0	-15.7	-78.0
North Korea	-22.4	-76.8	-85.8	-89.3	-92.1	-99.5
Pakistan	-1.8	-2.1	-8.8	-20.0	-30.7	-65.7
Russia	-13.6	-53.6	-73.3	-80.6	-84.5	-99.7
United Kingdom	0.1	-23.1	-39.2	-57.9	-69.7	-99.5
United States	-10.5	-41.4	-59.3	-72.4	-81.5	-98.9
Global Average	-6.0	-18.7	-30.1	-38.3	-45.6	-79.0

Table S2. Calorie reduction (%) from the major food crops (maize, rice, soybean and spring wheat) and marine fish averaged over the first five years after simulated nuclear conflicts for all nations calculated.

Nation	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Afghanistan	-3.2	-14.7	-19.0	-19.2	-21.7	-81.7
Albania	16.8	14.0	-4.2	-28.3	-29.2	-89.2
Algeria	13.6	6.5	17.7	138.0	227.5	22.2
Angola	-7.6	-12.2	-23.4	-33.4	-39.2	-71.8
Antigua and Barbuda	-4.5	-6.4	-4.7	-4.8	-2.6	21.9
Argentina	-2.8	-5.8	-15.4	-24.2	-32.0	-69.1
Armenia	15.8	14.3	14.5	17.3	15.1	-99.5
Australia	0.4	-6.2	-11.4	-21.7	-21.4	-26.7
Austria	-20.3	-54.9	-72.8	-82.9	-88.6	-100.0
Azerbaijan	13.9	4.7	7.3	4.8	2.0	-98.2
Bahamas	0.5	4.1	6.7	7.7	10.4	-10.2
Bangladesh	-7.4	8.4	19.5	2.4	-17.4	-63.3
Barbados	-3.6	-6.8	-9.8	-9.4	-9.1	3.1
Belarus	-22.6	-31.6	-53.4	-72.7	-82.0	-100.0
Belgium	-6.5	-26.3	-43.8	-47.7	-61.1	-99.8
Belize	11.8	10.3	6.3	4.3	-2.3	-58.8
Benin	1.1	-3.5	0.4	-1.4	-3.8	-62.1
Bolivia	-1.7	-12.6	-22.2	-34.0	-38.9	-70.4
Bosnia and Herzegovina	-0.7	12.6	-39.3	-63.7	-68.4	-98.1
Botswana	1.8	1.7	-6.7	-18.9	-26.8	-73.8
Brazil	0.3	-2.9	-12.9	-20.5	-29.9	-66.5
Bulgaria	11.4	2.6	-2.1	-12.8	-13.8	-99.0
Burkina Faso	0.7	-4.8	-4.8	0.5	-6.6	-61.5
Cambodia	-5.9	-11.1	-14.4	-16.4	-15.8	-41.3
Cameroon	8.0	11.9	15.4	11.0	12.1	-77.2
Canada	-54.8	-95.6	-98.5	-98.7	-99.1	-99.5
Cape Verde	0.0	0.0	-0.1	-0.1	-0.1	-0.1
Central African Republic	-3.2	-7.0	-17.2	-21.3	-28.2	-79.7
Chad	1.1	9.9	11.8	17.0	23.3	-66.7
Chile	-9.7	-11.8	-4.5	-12.2	-23.0	-54.0
China	-13.2	-38.5	-59.0	-71.1	-79.3	-97.1
Colombia	-1.5	-7.1	-15.8	-24.2	-29.2	-76.9
Congo	0.6	-1.6	-1.2	-0.5	-0.9	-4.0
Costa Rica	74.2	253.5	174.3	254.4	289.7	319.0
Côte d'Ivoire	4.2	5.8	3.8	2.7	-3.1	-70.3
Croatia	-0.3	-6.0	-35.0	-57.4	-64.1	-97.9
Cuba	16.9	31.3	8.0	0.3	-4.9	-65.9
Cyprus	-1.5	1.8	5.4	18.0	27.8	-14.7
Czech Republic	-8.1	-21.4	-37.6	-65.0	-77.4	-99.4
Denmark	9.3	-12.4	-46.9	-63.2	-82.9	-97.6

Nation	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Dominica	-3.3	-5.4	-5.4	-6.0	-5.5	14.0
Dominican Republic	10.4	49.3	46.3	42.4	45.3	-42.5
Ecuador	0.0	-4.5	-10.3	-16.1	-22.5	-66.8
Egypt	1.7	-2.6	-6.2	-8.0	-13.1	-63.7
El Salvador	14.3	31.3	20.5	18.9	9.0	-65.2
Estonia	11.5	-33.7	-79.6	-85.3	-93.8	-99.1
Ethiopia	-0.3	-11.2	-24.2	-37.5	-49.3	-78.3
Fiji	-1.5	-2.7	-2.9	-2.3	-1.9	-3.9
Finland	-39.7	-89.3	-94.8	-96.7	-97.2	-98.4
France	-3.5	-16.5	-30.1	-29.5	-41.8	-97.5
French Polynesia	-3.2	-3.5	-4.9	-4.4	-6.1	-15.5
Gabon	-0.4	-0.4	-6.0	-10.0	-13.8	-61.3
Gambia	-18.3	-40.8	-24.6	-18.4	-38.3	302.4
Georgia	7.0	-7.3	-33.2	-46.0	-51.6	-97.3
Germany	-8.5	-30.7	-47.2	-64.8	-76.6	-99.9
Ghana	-0.6	-1.7	-3.8	-5.1	-6.2	-56.8
Greece	8.9	10.9	13.2	-2.5	-0.4	-78.8
Grenada	-16.5	-23.5	-28.5	-28.1	-28.3	-22.4
Guatemala	7.7	9.7	1.3	0.3	-5.3	-74.2
Guinea	-5.4	-4.2	-7.1	5.3	-1.0	-71.3
Guinea-Bissau	7.6	16.3	20.7	21.0	15.9	-35.9
Guyana	13.1	96.6	121.8	98.2	100.2	-30.2
Haiti	77.2	273.0	330.1	311.3	318.4	68.1
Honduras	9.4	16.0	10.4	9.9	1.0	-60.5
Hungary	-17.1	-43.4	-61.6	-71.2	-75.6	-99.4
Iceland	-13.0	-30.1	-41.1	-46.2	-48.8	-70.1
India	-4.4	-5.5	-9.0	-14.7	-22.5	-57.2
Indonesia	-1.8	-3.6	-9.5	-14.4	-21.7	-60.3
Iran	-4.5	-12.5	-20.9	-22.6	-28.5	-77.7
Iraq	-3.6	-9.2	-17.8	-21.2	-25.9	-52.8
Ireland	-3.1	-11.8	-26.3	-44.7	-58.1	-97.4
Israel	2.6	-0.1	-5.9	-7.0	-15.7	-78.0
Italy	-2.7	-12.9	-21.6	-33.6	-42.2	-89.6
Jamaica	34.2	78.8	98.1	88.8	79.2	26.0
Japan	3.8	-48.2	-65.9	-73.9	-77.2	-95.2
Jordan	4.1	0.7	-4.0	-5.3	-14.0	-82.0
Kazakhstan	-6.6	-15.8	-30.0	-41.4	-48.5	-99.7
Kenya	-2.0	-9.2	-15.7	-27.1	-35.5	-70.0
Kiribati	-6.3	-11.6	-17.3	-22.4	-26.6	-34.0
Kuwait	6.2	-6.7	-7.3	2.9	-12.8	-76.6
Kyrgyzstan	1.4	-22.9	-45.9	-61.7	-72.3	-99.8
Laos	-7.5	-22.9	-33.3	-46.3	-55.5	-87.1
Latvia	0.3	-6.9	-64.0	-71.7	-84.2	-99.1
Lebanon	0.8	-4.0	-7.2	-0.9	-3.3	-47.5

Nation	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Lesotho	-3.6	-22.7	-37.2	-48.4	-64.1	-78.1
Liberia	-2.6	2.5	2.6	-4.8	-11.4	-68.6
Lithuania	-13.2	-6.7	-51.7	-66.9	-80.5	-99.8
Luxembourg	-0.4	-12.6	-32.9	-35.8	-55.7	-100.0
Macedonia	17.0	15.1	11.0	-6.8	-8.0	-94.9
Madagascar	1.5	2.1	-12.8	-17.0	-29.7	-64.3
Malawi	3.3	-2.8	-13.0	-19.9	-32.1	-66.8
Malaysia	-5.8	-6.3	-11.7	-10.2	-23.1	-62.4
Maldives	-7.2	-0.2	-2.0	-8.2	-6.9	-6.7
Mali	-5.0	-14.1	-13.2	-8.6	-13.8	-62.1
Malta	1.2	2.3	1.6	0.5	-0.7	-6.2
Mauritania	0.6	-13.1	3.2	-9.0	-12.7	-20.1
Mauritius	-3.4	0.3	-1.3	-3.5	-5.1	-17.2
Mexico	-7.1	-18.7	-32.0	-41.6	-49.3	-93.0
Moldova	-10.1	-40.6	-57.8	-71.1	-74.9	-100.0
Mongolia	-28.0	-53.1	-89.0	-97.3	-99.4	-100.0
Montenegro	11.9	17.7	4.3	-19.2	-22.9	-89.2
Morocco	-1.0	-2.2	5.7	55.2	67.4	-47.0
Mozambique	6.5	5.4	6.0	-0.5	-11.9	-55.2
Myanmar	-2.5	-23.7	-38.4	-53.9	-65.8	-87.1
Namibia	-6.8	-13.7	-18.8	-25.5	-25.1	-54.0
Nepal	-5.8	-31.3	-38.2	-47.1	-56.9	-90.2
Netherlands	-6.7	-26.7	-33.4	-46.8	-60.3	-96.3
New Caledonia	0.1	0.0	-0.1	0.0	0.0	-0.4
New Zealand	-2.3	-9.5	-18.1	-27.8	-29.5	-58.2
Nicaragua	3.8	8.4	-0.5	-2.4	-8.3	-64.7
Niger	24.4	35.9	59.7	68.3	67.0	-65.6
Nigeria	-0.1	0.0	-0.6	-1.9	-4.0	-66.9
North Korea	-22.4	-76.8	-85.8	-89.3	-92.1	-99.5
Norway	-17.6	-40.8	-48.3	-52.9	-54.7	-73.6
Oman	-6.4	-0.8	13.9	7.0	4.3	47.7
Pakistan	-1.8	-2.1	-8.8	-20.0	-30.7	-65.7
Panama	34.8	143.7	103.9	167.1	182.2	112.5
Papua New Guinea	-5.4	-15.7	-16.4	-18.4	-20.1	-19.4
Paraguay	8.3	6.6	-2.7	-12.6	-23.0	-67.0
Peru	-2.4	-11.1	-19.4	-26.1	-30.6	-66.4
Philippines	1.7	-4.2	-8.7	-6.5	-18.2	-60.1
Poland	-13.1	-32.8	-43.6	-65.4	-74.2	-99.8
Portugal	5.7	4.4	-23.3	-42.1	-59.5	-92.0
Romania	-15.8	-39.9	-56.7	-68.0	-72.7	-99.8
Russia	-13.6	-53.6	-73.3	-80.6	-84.5	-99.7
Rwanda	-11.1	-27.4	-41.9	-52.9	-62.7	-78.4
Saint Kitts and Nevis	-3.0	-5.7	-3.2	-4.1	-2.1	19.9
Saint Lucia	-4.2	-5.5	-7.4	-7.1	-5.8	7.1

Nation	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Saint Vincent and the Grenadines	-8.1	-10.1	-12.5	-11.7	-10.6	-0.6
Samoa	-5.6	-5.6	-7.7	-6.5	-10.1	-13.7
Sao Tome and Principe	-1.2	-0.4	0.0	3.1	3.3	5.0
Saudi Arabia	18.2	7.6	8.6	6.4	18.7	30.1
Senegal	5.2	4.7	11.5	12.2	6.2	-37.2
Serbia	-7.3	-23.7	-52.8	-65.3	-70.6	-99.7
Sierra Leone	-11.0	-9.5	-13.0	-6.4	-8.5	-69.3
Slovakia	-14.9	-38.6	-49.9	-65.4	-72.0	-99.6
Slovenia	-10.1	-46.0	-68.7	-77.4	-81.7	-99.7
Solomon Islands	-1.8	-10.1	-13.3	-15.0	-16.3	-13.2
South Africa	-5.4	-18.5	-29.9	-37.7	-49.7	-73.8
South Korea	-4.3	-38.3	-53.6	-72.1	-78.3	-96.6
Spain	6.2	19.3	10.9	16.3	10.9	-78.6
Sri Lanka	-10.0	1.2	-0.8	13.5	-3.2	-38.5
Sudan	11.3	10.4	11.0	6.8	16.8	-43.1
Suriname	30.7	130.5	163.9	145.4	161.2	10.4
Sweden	-35.6	-75.7	-90.3	-94.6	-97.3	-99.2
Switzerland	-12.3	-29.3	-46.5	-58.3	-72.7	-99.9
Tajikistan	-3.1	-22.1	-41.8	-52.9	-63.8	-98.3
Tanzania	-6.8	-17.4	-27.8	-31.5	-45.7	-73.0
Thailand	-4.7	-8.9	-11.3	-23.4	-35.9	-76.6
Tokelau	0.0	0.0	0.0	0.0	0.0	-0.1
Togo	-1.9	-3.1	-5.6	-8.2	-7.6	-55.5
Trinidad and Tobago	-1.1	-3.0	-4.5	-4.5	-4.6	-4.7
Tunisia	-3.2	-2.9	17.4	42.2	69.7	-5.8
Turkey	10.6	11.3	2.4	4.4	4.1	-85.8
Turkmenistan	-4.3	-19.4	-29.7	-35.4	-37.3	-87.4
Uganda	-2.0	-13.2	-27.4	-40.3	-50.5	-83.7
Ukraine	-4.9	-39.8	-51.2	-69.0	-73.2	-100.0
United Arab Emirates	3.9	35.0	109.6	46.1	-5.5	25.2
United Kingdom	0.1	-23.1	-39.2	-57.9	-69.7	-99.5
United States	-10.5	-41.4	-59.3	-72.4	-81.5	-98.9
Uruguay	-6.7	-2.0	-10.1	-22.5	-28.1	-68.6
Uzbekistan	-0.3	-10.8	-18.5	-24.3	-27.6	-90.7
Vanuatu	1.0	-2.4	-3.9	-5.2	-4.9	-4.1
Venezuela	6.4	11.7	14.2	9.6	1.6	-61.0
Vietnam	-4.7	-19.5	-27.7	-43.0	-55.5	-80.4
Yemen	28.9	20.6	16.7	20.9	18.7	-35.1
Zambia	1.1	-8.4	-21.1	-33.1	-42.3	-73.6
Zimbabwe	3.4	0.6	-5.7	-14.9	-31.9	-70.4

Table S3. Assumptions for the *Livestock* and *No Livestock* cases. Livestock includes meat, dairy, eggs, and aquaculture. Inland fish capture, a minor source of food, is not considered in either case.

Assumptions	With livestock	No livestock
Reduction in cereals	✓	✓
Reduction in vegetables, fruit and nuts	✓	✓
Reduction in marine wild catch	✓	✓
Marine fishery effort	Business as usual	Five times the effort ¹⁷
Livestock, aquaculture	No change	Killed in Year 1
Livestock feed from crops	For animal feed	Portion for human consumption

Table S4. Computed per capita daily food energy (kcal/capita/day) intake in Year 2 for all nations calculated of the world assuming no trade after simulated nuclear conflicts under the *Livestock* case, assuming livestock production is continued. The second column is energy intake using data for 2013²², and the third column is calculated energy intake in 2013 if there is no international trade.

Nation	2013	2013 (no-trade)	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Afghanistan	2038	1663	1400	1304	1209	1166	1096	0
Albania	3361	1289	1145	1556	1363	1010	1065	85
Algeria	3321	1063	1018	1518	1255	2383	4434	416
Angola	2383	1264	1292	1146	1017	958	794	417
Argentina	3308	6866	6627	7241	6088	5324	4393	1637
Armenia	2992	2176	2451	2268	2123	2053	1365	1
Australia	3391	4077	3794	3266	4206	5044	5159	4643
Austria	3694	1560	1107	683	569	127	155	0
Azerbaijan	3145	1385	1448	1213	1176	1107	963	0
Bangladesh	2564	2280	2196	2852	3719	2840	2486	62
Belarus	3268	1350	1842	1313	625	71	10	0
Belgium	3764	1959	1603	1438	1311	742	871	13
Belize	2776	1454	1522	1525	1516	1550	1320	371
Benin	2757	2381	2559	2120	2426	2247	2446	924
Bolivia	2410	1879	1798	1575	1403	1172	1132	498
Bosnia and Herzegovina	3302	1495	1028	1303	869	514	518	5
Botswana	2339	83	97	80	80	72	62	24
Brazil	3300	3359	3489	3602	3226	2865	2573	1302
Bulgaria	2857	4173	3841	4878	4381	3120	3802	1
Burkina Faso	2739	1813	1866	1658	1741	1880	1697	524
Cambodia	2492	1886	1456	1494	1665	1363	893	83
Cameroon	2732	1527	1551	1400	1302	1331	1283	254
Canada	3567	5752	2573	75	43	20	15	6
Central African Republic	1784	1083	1022	978	802	812	759	178
Chad	2113	1614	1658	1853	2019	1744	2509	417
Chile	3028	2189	2584	1779	2358	2387	1845	726
China	3205	2891	2508	1519	1033	634	452	10
Colombia	3112	1541	1570	1519	1343	1209	1128	268
Côte d'Ivoire	2777	3792	3943	3996	4189	3590	4085	571
Croatia	3071	2385	2109	2096	1663	998	996	36
Cuba	3342	1451	1880	2217	1928	1897	1729	528
Cyprus	3015	776	1036	999	1122	1325	1786	353
Czech Republic	3278	1906	1773	1489	1248	141	233	5

Nation	2013	2013 (no-trade)	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Denmark	3399	2191	2987	1979	556	163	150	72
Djibouti	2695	198	228	216	177	178	145	40
Dominican Republic	2892	2143	2639	4216	3353	3929	3470	1755
Ecuador	2607	1352	1399	1300	1258	1257	1163	442
Egypt	3288	2104	2139	2063	1968	1784	1594	350
El Salvador	2696	1386	1419	1853	1759	1679	1553	284
Estonia	3247	2405	4155	694	112	86	86	49
Ethiopia	2337	1534	1511	1269	1054	961	686	152
Finland	3340	1140	570	3	3	3	2	1
France	3501	2480	2348	1947	1875	1701	1619	14
Gabon	2634	520	522	527	447	451	427	186
Gambia	2531	591	563	204	392	731	418	7798
Georgia	2838	755	784	558	299	184	162	2
Germany	3554	2361	2226	1565	1459	402	347	5
Ghana	3029	228	235	216	218	211	217	94
Greece	3381	2000	1831	2799	2591	2006	2033	70
Guatemala	2550	2643	3149	3249	3121	3225	2738	594
Guinea	2743	1853	1722	1820	1789	2186	2073	344
Guinea-Bissau	2229	1484	1423	1534	1919	1913	1871	1306
Guyana	2912	2108	2712	4824	4094	3975	3952	2025
Haiti	2120	1208	2453	7219	6030	6262	5314	1790
Honduras	2670	1145	1157	1278	1302	1251	1131	306
Hungary	3317	2900	2624	1665	1400	784	591	4
Iceland	3656	8950	7896	7054	6044	5857	5636	3833
India	2530	2620	2553	2602	2644	2423	2063	829
Indonesia	2882	2226	2188	2202	1921	1844	1634	817
Iran	3084	3198	3051	2763	2225	2030	1881	53
Iraq	2606	954	922	923	802	647	642	4
Ireland	3885	1282	1334	965	874	793	524	205
Israel	3527	1515	1928	1738	1683	1641	1476	303
Italy	3500	4121	3878	3633	3136	2397	2361	241
Jamaica	2785	977	1481	3585	3443	3311	2566	850
Japan	2707	1009	959	504	328	191	130	42
Jordan	2729	621	900	876	815	821	719	39
Kazakhstan	3065	2379	2101	1828	1253	744	336	0
Kenya	2191	1399	1300	1102	1035	904	787	217
Kuwait	3471	126	148	134	139	122	119	2
Kyrgyzstan	2728	2246	2098	1557	1077	726	385	0
Laos	2756	2238	1824	1235	1053	938	695	30
Latvia	3229	3833	6774	3021	192	4	18	2
Lebanon	2851	1036	1233	1110	1123	1258	1382	317
Lesotho	2321	556	557	375	331	303	215	68

Nation	2013	2013 (no-trade)	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Liberia	2164	983	939	1042	1047	932	1018	215
Lithuania	3410	4334	6864	4796	1275	72	87	38
Luxembourg	3470	1187	1152	1030	981	642	529	0
Macedonia	3069	1412	1220	2036	1950	1406	1411	10
Madagascar	1934	1670	1679	1746	1425	1488	1221	637
Malawi	2392	1733	1858	1817	1561	1340	1025	541
Malaysia	2843	1266	1279	1181	1043	1117	1065	440
Mali	2873	2223	1979	1862	1914	2475	1929	485
Mauritania	2871	528	417	356	509	543	536	171
Mexico	3157	4078	3933	3196	2730	2458	1976	583
Mongolia	2575	1373	1029	512	143	81	24	0
Montenegro	3499	463	380	544	492	352	370	13
Morocco	3410	2494	2524	3922	3027	5338	5584	524
Mozambique	2097	964	1190	944	988	930	793	474
Myanmar	2671	2730	2588	2144	1698	1340	1036	374
Namibia	2464	769	757	522	612	554	621	346
Nepal	2769	1853	1661	1247	1120	976	674	37
Netherlands	3297	5170	5165	3533	3055	1645	1360	46
New Zealand	3192	2475	2308	2308	2108	1874	1838	1021
Nicaragua	2582	3049	2957	3211	2906	2904	2664	915
Niger	2569	1261	1186	1415	1828	1917	1873	236
Nigeria	2569	2399	2442	2269	2445	2253	2521	760
North Korea	2012	1694	1480	165	129	19	7	0
Norway	3366	766	344	39	17	16	12	10
Oman	2938	417	624	1606	947	2022	1210	5278
Pakistan	2484	2559	2510	2910	2946	2094	1953	354
Panama	2849	1162	986	3169	1721	2828	2903	1890
Paraguay	2768	4759	4826	4687	4524	4082	3316	1152
Peru	2774	2534	2553	2184	1966	1871	1761	892
Philippines	2657	2230	2153	1837	2065	2076	2160	1111
Poland	3536	1979	2165	1536	1310	97	126	1
Portugal	3479	1072	1187	1004	703	542	395	72
Romania	3578	3001	2719	1819	1467	761	708	7
Russia	3342	2616	2554	850	362	218	204	9
Rwanda	2186	1456	1362	1060	847	630	567	172
Saudi Arabia	3307	759	821	1007	979	768	1100	389
Senegal	2548	668	614	560	773	736	715	475
Serbia	2824	2790	2264	1582	1344	791	673	7
Sierra Leone	2368	1493	1302	1376	1323	1442	1721	334
Slovakia	2870	1952	1797	1296	1214	463	444	0
Slovenia	3194	1157	964	666	538	268	289	6
South Africa	2895	2822	2804	2338	2064	1800	1547	538
South Korea	3417	1597	1672	863	677	219	18	0

Nation	2013	2013 (no-trade)	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Spain	3324	3137	3671	4055	3522	3784	3486	380
Sri Lanka	2737	2217	1870	2116	2103	2207	1958	1775
Sudan	2576	2743	3277	3362	3359	3563	3674	1351
Suriname	2694	1507	2353	5338	4799	4680	4585	2506
Sweden	3182	1384	854	266	32	19	18	11
Switzerland	3355	576	487	398	358	134	155	1
Tajikistan	2107	1201	1048	690	581	459	273	0
Tanzania	2370	2082	2121	1300	1202	1120	968	389
Thailand	2801	3751	3106	2881	2761	2333	1711	202
Togo	2441	3083	3289	2820	2962	2820	3133	1197
Tunisia	3452	1573	1856	2072	2420	3577	3832	666
Turkey	3708	3200	3377	3911	3386	3289	3415	34
Turkmenistan	2832	1781	1399	1105	981	917	895	0
Uganda	1981	2779	1402	1121	904	599	402	32
Ukraine	3102	3628	4117	2398	1987	799	786	2
United Arab Emirates	3312	727	706	2880	9971	398	336	675
United Kingdom	3343	1252	1261	843	704	475	269	53
United States	3777	3014	2628	1587	1106	705	395	36
Uruguay	3198	5552	5182	5308	5377	4202	3361	1738
Uzbekistan	3011	2274	1921	1768	1557	1505	1375	0
Venezuela	2120	849	828	955	858	866	792	263
Yemen	2152	351	412	582	523	521	498	143
Zambia	2000	1497	1584	1481	1212	1044	849	468
Zimbabwe	1904	927	1115	964	919	815	625	318

Table S5. Computed per capita daily food energy (kcal/capita/day) intake in Year 2 for all nations calculated of the world assuming no trade after simulated nuclear conflicts under the *No Livestock* case, assuming that livestock and aquaculture productions are killed and 50% of livestock grain feed is for human consumption. The second column is energy intake using data for 2013²², and the third column is calculated energy intake in 2013 if no international trade.

Nation	2013	2013 (no-trade)	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Afghanistan	2038	1663	1252	1173	1094	1056	995	3
Albania	3361	1289	1227	1577	1132	754	800	32
Algeria	3321	1063	1003	1498	1242	2370	4426	415
Angola	2383	1264	1191	1076	963	922	784	474
Argentina	3308	6866	11201	12737	10438	8950	7173	2032
Armenia	2992	2176	2360	2188	2075	2034	1460	309
Australia	3391	4077	5141	4401	5866	7157	7356	6686
Austria	3694	1560	1688	1046	895	311	348	146
Azerbaijan	3145	1385	1516	1276	1249	1178	1036	98
Bangladesh	2564	2280	2199	2846	3717	2847	2496	81
Belarus	3268	1350	2860	1953	1060	283	219	214
Belgium	3764	1959	748	573	560	424	281	2
Belize	2776	1454	2274	2238	2252	2259	1989	844
Benin	2757	2381	2645	2224	2518	2328	2547	1003
Bolivia	2410	1879	2519	2211	1982	1613	1575	625
Bosnia and Herzegovina	3302	1495	1279	1600	1115	707	717	128
Botswana	2339	83	93	76	76	68	59	22
Brazil	3300	3359	5537	5778	5172	4599	4133	2100
Bulgaria	2857	4173	13358	17635	16194	12076	14374	196
Burkina Faso	2739	1813	1770	1581	1666	1797	1629	499
Cambodia	2492	1886	1561	1562	1751	1455	973	79
Cameroon	2732	1527	1598	1451	1353	1379	1332	338
Canada	3567	5752	5251	1046	440	311	307	299
Central African Republic	1784	1083	980	941	778	788	739	202
Chad	2113	1614	1608	1804	1967	1697	2447	407
Chile	3028	2189	2512	1595	2317	2422	1776	548
China	3205	2891	2535	1484	998	601	454	50
Colombia	3112	1541	1582	1544	1409	1294	1226	526
Côte d'Ivoire	2777	3792	3962	4013	4204	3616	4103	656
Croatia	3071	2385	3524	3103	2083	1167	1171	111
Cuba	3342	1451	1862	2102	1891	1872	1744	880
Cyprus	3015	776	938	895	1000	1193	1622	302

Nation	2013	2013 (no-trade)	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Czech Republic	3278	1906	2547	2138	1819	279	426	123
Denmark	3399	2191	6147	4160	1010	147	137	93
Djibouti	2695	198	62	62	49	50	39	5
Dominican Republic	2892	2143	2412	3502	2847	3197	2854	1671
Ecuador	2607	1352	1465	1388	1367	1371	1282	590
Egypt	3288	2104	2429	2350	2323	2129	1921	559
El Salvador	2696	1386	1772	2189	2099	2022	1893	669
Estonia	3247	2405	4841	777	107	102	98	65
Ethiopia	2337	1534	1520	1278	1058	965	686	147
Finland	3340	1140	720	19	19	19	19	18
France	3501	2480	3696	2933	2828	2563	2440	19
Gabon	2634	520	550	553	469	474	449	200
Gambia	2531	591	581	271	436	718	453	6664
Georgia	2838	755	971	678	337	194	170	3
Germany	3554	2361	2338	1676	1651	623	590	300
Ghana	3029	228	349	305	313	301	320	131
Greece	3381	2000	2662	3861	3265	2385	2364	249
Guatemala	2550	2643	2840	2926	2821	2882	2622	1157
Guinea	2743	1853	1816	1917	1885	2286	2166	283
Guinea-Bissau	2229	1484	1299	1398	1726	1716	1689	1217
Guyana	2912	2108	4608	8208	6970	6770	6729	3453
Haiti	2120	1208	2449	7188	6007	6228	5283	1781
Honduras	2670	1145	1210	1296	1311	1274	1193	603
Hungary	3317	2900	4566	2249	1848	961	870	2
Iceland	3656	8950	8335	7294	6551	6180	5988	4192
India	2530	2620	2393	2457	2496	2327	2010	936
Indonesia	2882	2226	2089	2110	1835	1763	1554	746
Iran	3084	3198	3159	2880	2396	2195	2016	338
Iraq	2606	954	1133	1125	980	796	767	6
Ireland	3885	1282	758	510	466	373	211	14
Israel	3527	1515	1621	1585	1510	1474	1246	337
Italy	3500	4121	2263	2031	1622	1061	1104	44
Jamaica	2785	977	1129	2121	2057	1949	1593	821
Japan	2707	1009	822	427	267	152	103	43
Jordan	2729	621	898	880	825	829	732	125
Kazakhstan	3065	2379	2716	2331	1550	877	355	31
Kenya	2191	1399	1123	945	881	774	675	174
Kuwait	3471	126	172	155	161	142	139	2
Kyrgyzstan	2728	2246	2102	1589	1203	946	701	535
Laos	2756	2238	2183	1470	1296	1199	941	22
Latvia	3229	3833	7238	3203	208	48	48	46

Nation	2013	2013 (no-trade)	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
Lebanon	2851	1036	1161	1059	1060	1196	1273	283
Lesotho	2321	556	495	326	288	262	181	52
Liberia	2164	983	874	970	975	872	953	229
Lithuania	3410	4334	7995	5377	1456	78	75	51
Luxembourg	3470	1187	1240	1053	1033	724	547	8
Macedonia	3069	1412	1382	1961	1787	1373	1363	345
Madagascar	1934	1670	1594	1658	1359	1425	1176	636
Malawi	2392	1733	2009	1966	1690	1451	1111	591
Malaysia	2843	1266	1194	1100	971	1043	998	414
Mali	2873	2223	1828	1734	1794	2236	1787	576
Mauritania	2871	528	354	302	437	461	462	131
Mexico	3157	4078	2293	1939	1684	1546	1286	554
Mongolia	2575	1373	624	256	16	8	7	7
Montenegro	3499	463	337	445	413	318	332	108
Morocco	3410	2494	2323	3660	2791	5090	5348	455
Mozambique	2097	964	1161	915	966	909	771	455
Myanmar	2671	2730	3218	2657	2106	1702	1294	554
Namibia	2464	769	561	405	446	412	462	273
Nepal	2769	1853	1843	1377	1228	1072	738	41
Netherlands	3297	5170	2415	1480	1483	945	465	9
New Zealand	3192	2475	1591	1603	1442	1244	1232	598
Nicaragua	2582	3049	2389	2627	2354	2356	2179	698
Niger	2569	1261	1119	1349	1749	1832	1792	218
Nigeria	2569	2399	2489	2316	2486	2302	2559	848
North Korea	2012	1694	1501	153	116	4	1	0
Norway	3366	766	330	61	44	43	43	38
Oman	2938	417	597	1551	912	1956	1168	5127
Pakistan	2484	2559	1757	2163	2145	1508	1463	292
Panama	2849	1162	872	2649	1463	2378	2448	1552
Paraguay	2768	4759	9074	8878	8488	7538	6075	1815
Peru	2774	2534	2101	1800	1625	1558	1461	793
Philippines	2657	2230	1677	1381	1644	1635	1722	831
Poland	3536	1979	2824	1923	1636	119	156	1
Portugal	3479	1072	1424	1180	847	653	530	245
Romania	3578	3001	4525	2302	1726	995	949	244
Russia	3342	2616	2924	924	397	246	240	23
Rwanda	2186	1456	1331	1037	828	613	556	166
Saudi Arabia	3307	759	826	1014	996	777	1114	391
Senegal	2548	668	582	530	736	694	677	447
Serbia	2824	2790	4454	2381	1838	1153	1008	259
Sierra Leone	2368	1493	1284	1355	1304	1418	1683	363
Slovakia	2870	1952	2343	1587	1491	566	565	26
Slovenia	3194	1157	1018	570	440	206	228	18

Nation	2013	2013 (no-trade)	5 Tg	16 Tg	27 Tg	37 Tg	47 Tg	150 Tg
South Africa	2895	2822	2928	2502	2247	2001	1763	836
South Korea	3417	1597	1425	721	561	151	25	12
Spain	3324	3137	2977	3414	2911	3155	2935	91
Sri Lanka	2737	2217	1831	2068	2045	2163	1916	1739
Sudan	2576	2743	2529	2577	2571	2656	2699	1848
Suriname	2694	1507	2341	5378	4835	4754	4675	2561
Sweden	3182	1384	853	289	40	29	28	21
Switzerland	3355	576	515	406	369	128	151	0
Tajikistan	2107	1201	1125	719	603	475	290	3
Tanzania	2370	2082	2073	1256	1156	1075	929	349
Thailand	2801	3751	3462	3177	3083	2747	2148	518
Togo	2441	3083	3274	2877	2994	2871	3147	1487
Tunisia	3452	1573	1752	1960	2341	3422	3692	617
Turkey	3708	3200	3475	3920	3385	3219	3294	304
Turkmenistan	2832	1781	1456	1237	1138	1068	1047	23
Uganda	1981	2779	1401	1119	903	594	403	32
Ukraine	3102	3628	7645	4190	3274	1592	1591	506
United Arab Emirates	3312	727	711	2884	9977	403	340	680
United Kingdom	3343	1252	1476	970	804	522	271	16
United States	3777	3014	4909	2745	1836	1072	593	160
Uruguay	3198	5552	5452	5668	5722	4432	3524	1679
Uzbekistan	3011	2274	1835	1761	1554	1510	1386	4
Venezuela	2120	849	259	255	253	252	252	250
Yemen	2152	351	782	914	831	835	770	243
Zambia	2000	1497	1708	1599	1303	1124	908	491
Zimbabwe	1904	927	1059	915	869	767	578	287

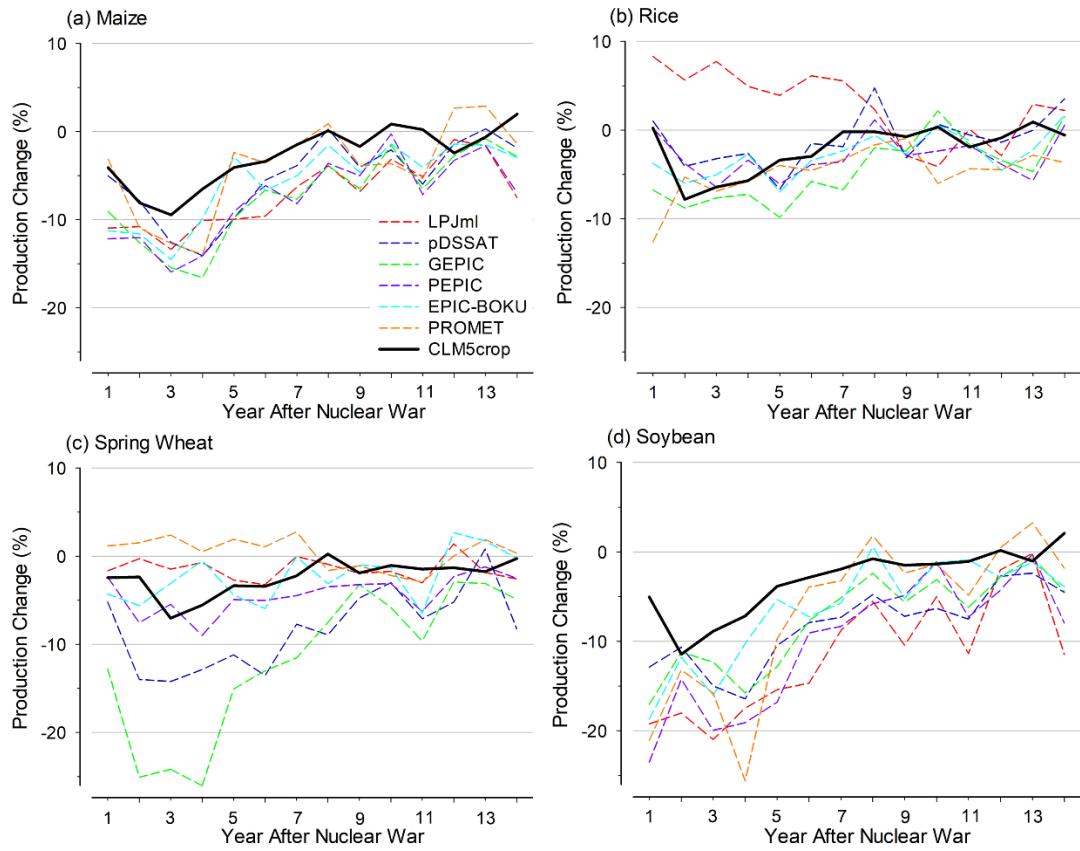


Figure S1. Global average crop production changes (%) of maize (a), rice (b), spring wheat (c) and soybean (d) in CLM5crop using raw climate forcing and in six other crop models¹¹ using the delta downscaling method under the 5 Tg scenario.

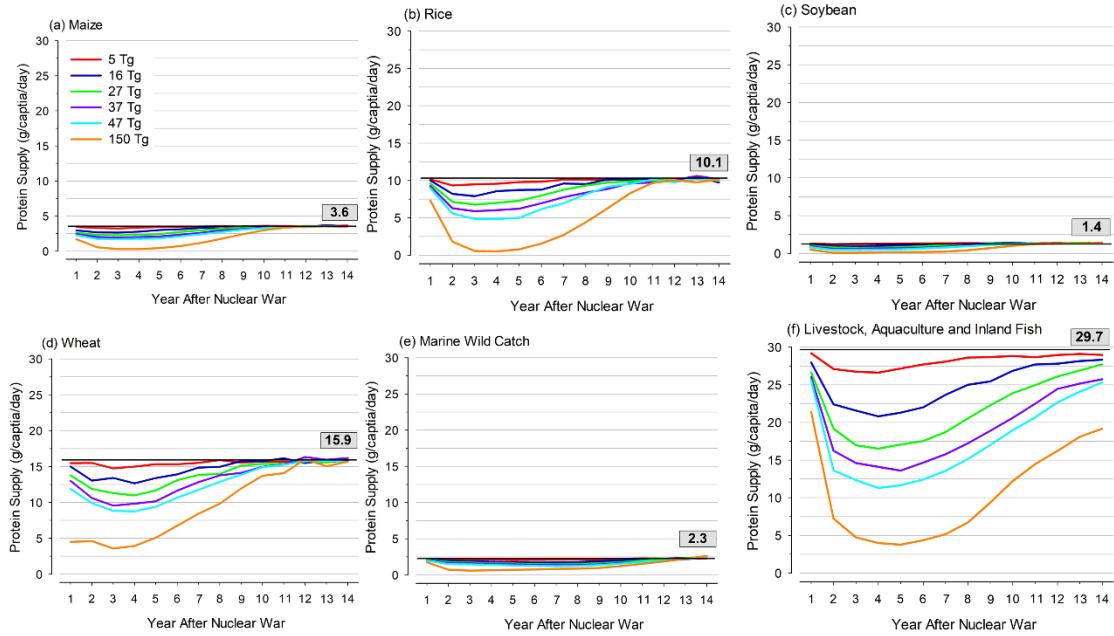


Figure S2. Global average annual protein supply (g/capita/day) in maize, rice, soybean, wheat, marine wild catch, and livestock, aquaculture and inland fish under different nuclear war scenarios. The black lines and numbers in gray boxes are the protein supply in 2013²².

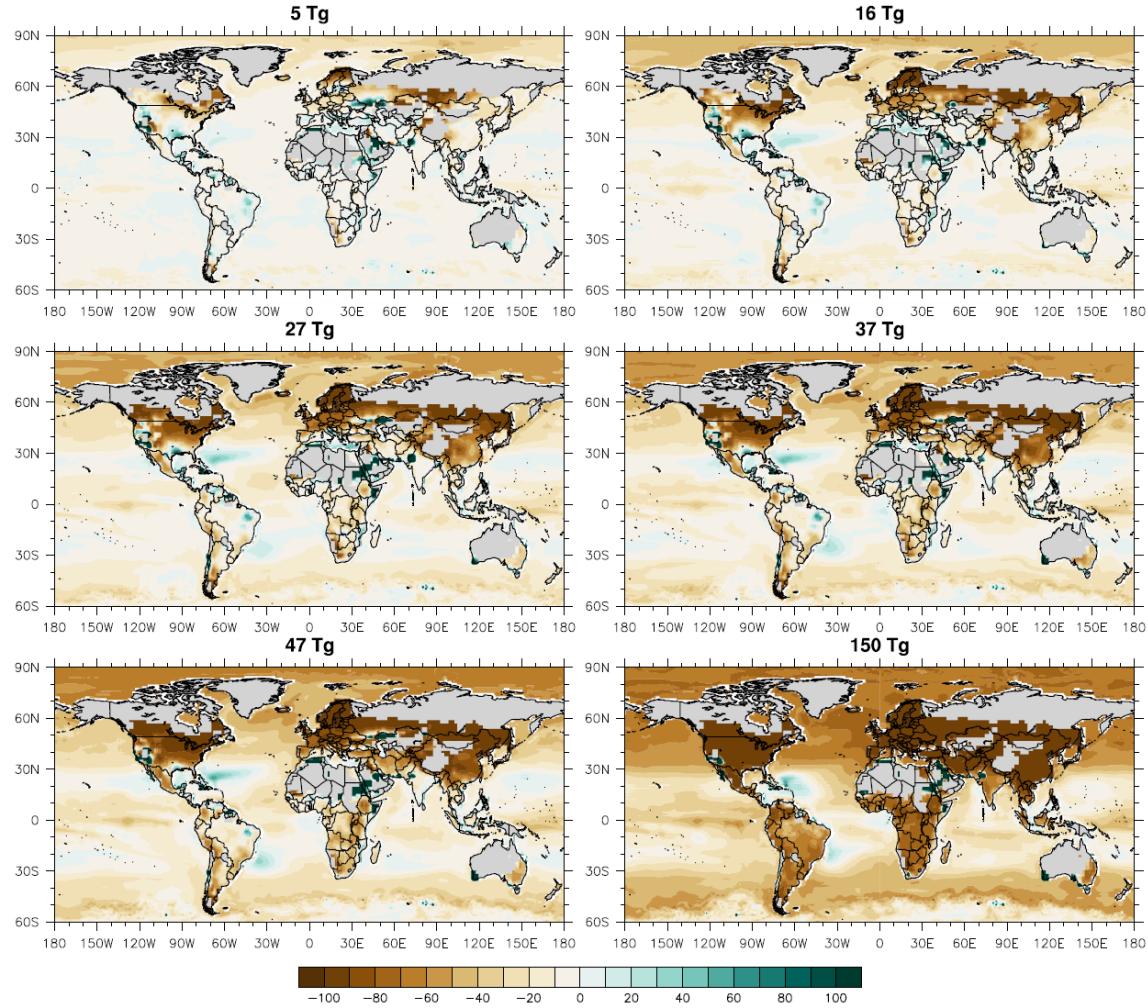


Figure S3. Change in caloric content of food (%) for the explicitly simulated agricultural crops and wild-caught marine fisheries combined. Percent change is between the nuclear war scenarios and the control simulation, averaged for the first five years after the nuclear conflicts from the four cereals and marine fish we modeled.

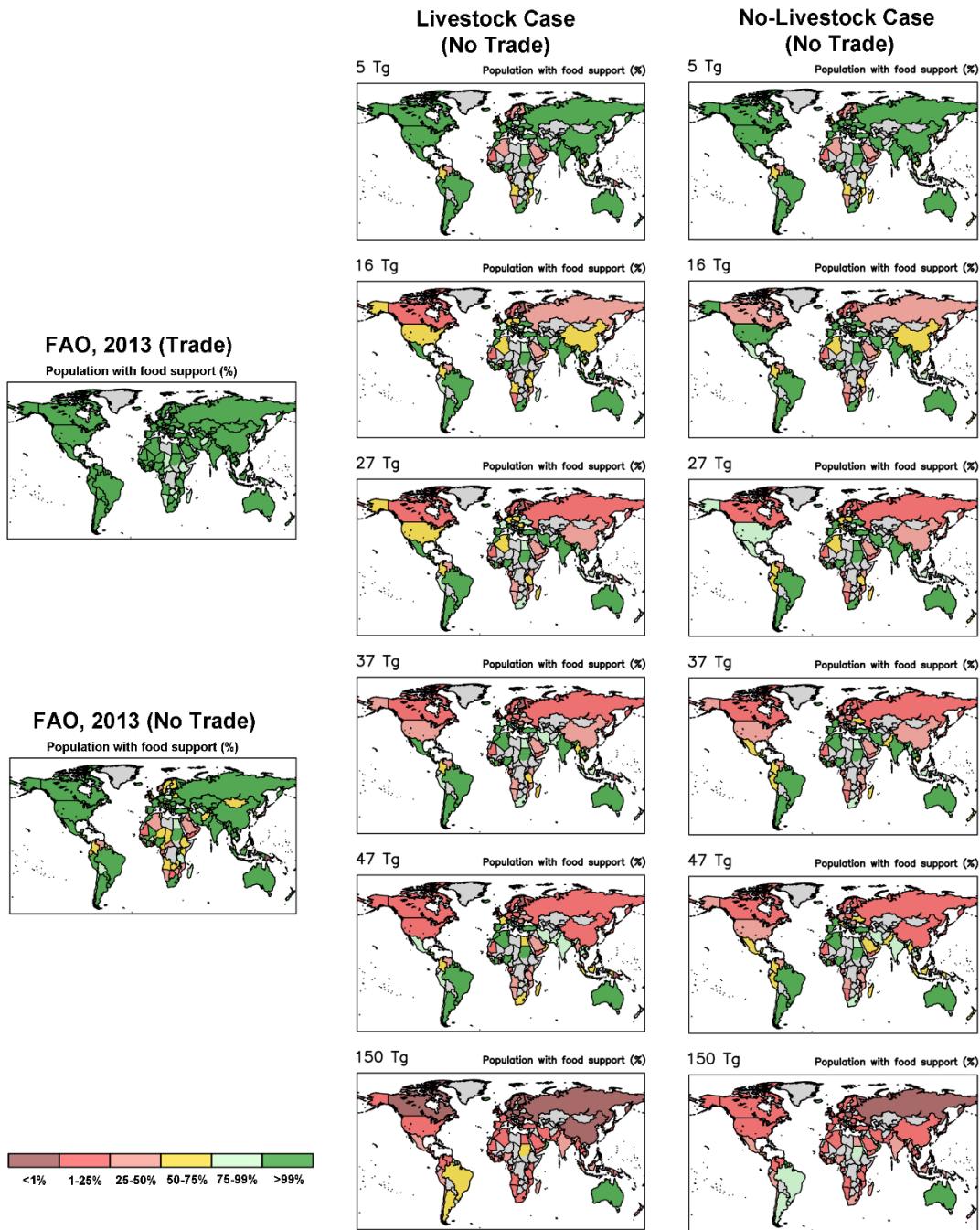


Figure S4. National population (%) alive at the end of Year 2 for a calorie intake of 2200 kcal/capita/day when the rest of the population is provided with no food, and for no international trade.

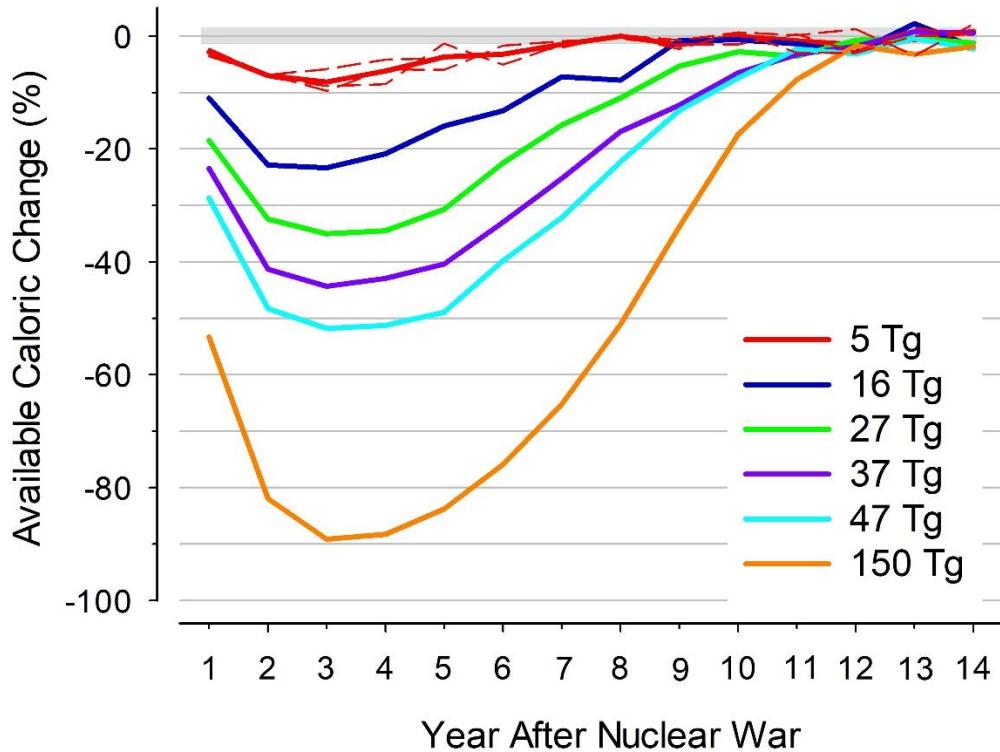


Figure S5. Global average annual crop calorie change (%) (maize, wheat, rice and soybean, weighted by their observed production (2013) and calorie content). The gray shading is the standard deviation of 45 years of control (3 ensemble control simulation of 15 years). The dashed red lines are the three ensemble members from the 5 Tg simulation.