**Table 1.** Number of weapons on urban targets, yields, direct fatalities from the bomb blasts, and resulting number of people in danger of death due to famine for the different scenarios we studied. The 5 Tg case scenario is from reference 16 for an India-Pakistan war taking place in 2008; the 16-47 Tg cases are from reference 18 for an India-Pakistan war taking place in 2025; and the 150 Tg case is from reference 52, which assumes attacks on France, Germany, Japan, U.K., U.S., Russia, and China. The last column is the number of people who would starve by the end of Year 2 when the rest of the population is provided with the minimum amount of food needed to survive, assumed to be a calorie intake of 1911 kcal/capita/day, and for no international trade, from Supplemental Information, Table S5, the Partial Livestock case, in which 50% of livestock grain feed used for human consumption, and 50% of livestock grain feed used to raise livestock, using the latest complete data available, for the year 2010. For 2010, the world population was 6,703,000,000. There are many other scenarios in which these amounts of soot could be produced by a nuclear war, and the scenarios we use are only meant to be illustrative examples. The last column is the case with the fewest number of deaths, and other cases are available in the Supplementary Information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Soot | Number of weapons | Yield | Number of direct fatalities | Number of people without food at the end of Year 2 |
| 5 Tg | 100 | 15 kt | 27,000,000 | 255,000,000 |
| 16 Tg | 250 | 15 kt | 52,000,000 | 926,000,000 |
| 27 Tg | 250 | 50 kt | 97,000,000 | 1,426,000,000 |
| 37 Tg | 250 | 100 kt | 127,000,000 | 2,081,000,000 |
| 47 Tg | 500 | 100 kt | 164,000,000 | 2,512,000,000 |
| 150 Tg | 4400 | 100 kt | 360,000,000 | 5,341,000,000 |
| 150 Tg | 4400 | 100 kt | 360,000,000 | 5,081,000,000 |

\*Assuming total household waste is added to food consumption.

**Table 2.**  Changes in food calorie availability (%) in Year 2 after a nuclear war for the nations with nuclear weapons and global average assuming no trade after simulated nuclear wars under the *Livestock Case*, the *Partial Livestock Case*, and the *No Livestock Case* with 50% livestock feed to human consumption. The total calorie reduction is referenced to the observed food calorie availability in 2010. China here includes Mainland China, Hong Kong, and Macao. 150 Tg + hw is half of the household waste added to food consumption, and 150 Tg + tw is total household waste added to food consumption. Bold is used for headings and global averages.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Nations** | **5 Tg** | **16 Tg** | **27 Tg** | **37 Tg** | **47 Tg** | **150 Tg** | **150 Tg + hw** | **150 Tg + tw** |
| **Livestock Case** | | | | | | | | |
| China | -14.1 | -47.4 | -64.0 | -77.7 | -83.5 | -99.5 | -99.5 | -99.4 |
| France | 1.6 | -13.0 | -17.2 | -26.0 | -29.4 | -98.3 | -97.9 | -97.6 |
| India | -4.6 | -4.7 | -2.0 | -9.4 | -21.6 | -66.8 | -64.1 | -61.4 |
| Israel | 25.4 | -5.0 | -1.9 | -4.5 | 3.8 | -63.3 | -55.2 | -46.9 |
| North Korea | -18.1 | -88.7 | -90.7 | -98.3 | -99.2 | -99.9 | -99.9 | -99.9 |
| Pakistan | -0.9 | 15.9 | 18.5 | -13.8 | -19.9 | -85.3 | -84.1 | -82.8 |
| Russia | 1.3 | -62.3 | -83.1 | -89.6 | -90.9 | -99.0 | -98.9 | -98.7 |
| United Kingdom | 1.2 | -29.7 | -40.5 | -56.9 | -72.2 | -89.0 | -87.1 | -85.2 |
| United States | -11.2 | -45.8 | -62.0 | -75.7 | -86.3 | -98.8 | -98.5 | -98.3 |
| **Global** | **-8.2** | **-23.8** | **-33.4** | **-42.1** | **-49.2** | **-81.3** | **-78.8** | **-76.5** |
| **Partial Livestock Case**  **(50% livestock feed to human consumption, 50% livestock feed to livestock)** | | | | | | | | |
| China | -2.1 | -40.6 | -59.8 | -75.2 | -81.5 | -99.6 | -99.5 | -99.5 |
| France | 58.8 | 33.2 | 28.2 | 16.3 | 10.8 | -99.0 | -98.8 | -98.6 |
| India | -1.4 | -0.2 | 2.7 | -4.7 | -17.8 | -65.0 | -62.1 | -59.2 |
| Israel | 16.7 | 0.3 | -1.1 | -3.8 | -8.1 | -75.5 | -70.0 | -64.5 |
| North Korea | -13.3 | -88.7 | -90.9 | -98.8 | -99.5 | -99.9 | -99.9 | -99.9 |
| Pakistan | -1.4 | 20.8 | 21.6 | -11.9 | -16.0 | -83.6 | -82.2 | -80.8 |
| Russia | 25.3 | -56.1 | -80.6 | -88.0 | -88.7 | -99.0 | -98.9 | -98.7 |
| United Kingdom | 30.7 | -12.5 | -27.0 | -50.7 | -72.1 | -94.4 | -93.4 | -92.5 |
| United States | 70.8 | -0.5 | -32.7 | -60.4 | -78.9 | -99.1 | -98.9 | -98.7 |
| **Global** | **13.5** | **-5.7** | **-17.4** | **-28.1** | **-36.7** | **-77.1** | **-74.0** | **-71.2** |
| **No Livestock Case (50% livestock feed to human consumption)** | | | | | | | | |
| China | -11.4 | -46.6 | -64.0 | -77.9 | -83.5 | -99.7 | -99.6 | -99.5 |
| France | 45.2 | 20.5 | 16.6 | 6.6 | 1.4 | -99.8 | -99.7 | -99.7 |
| India | -5.4 | -3.1 | -0.2 | -7.0 | -20.0 | -65.8 | -63.0 | -60.1 |
| Israel | -24.7 | -26.7 | -30.6 | -32.4 | -44.3 | -91.5 | -89.5 | -87.7 |
| North Korea | -16.0 | -89.6 | -91.8 | -99.4 | -99.8 | -99.9 | -99.9 | -99.9 |
| Pakistan | -12.1 | 12.7 | 11.8 | -19.4 | -21.2 | -83.7 | -82.4 | -81.0 |
| Russia | 16.4 | -60.7 | -82.6 | -89.0 | -89.2 | -99.0 | -98.9 | -98.8 |
| United Kingdom | 15.9 | -24.2 | -37.3 | -59.7 | -79.7 | -99.8 | -99.8 | -99.8 |
| United States | 60.3 | -8.1 | -38.6 | -65.1 | -81.8 | -99.5 | -99.4 | -99.3 |
| **Global** | **5.9** | **-12.1** | **-22.9** | **-32.9** | **-40.8** | **-79.0** | **-76.3** | **-73.7** |