**SUPPLEMENTARY MATERIAL**

**Table S1**. Statistical regression models linking crop yields to climatic parameters.

| No. | Crop/ Region | Statistical model equation1 | Model’s performance2 |
| --- | --- | --- | --- |
| 1 | Oranges/ Epirus | Yt (kg/stremma) = 5561.44 + 1.973\*P11,t-1 + 1104.42\*ΤΜΙΝ1,t-1 – 1296.198\*TMAX1,t-1 – 1161.537\*Extr  Extr: dummy variable, with a value equal to 0 for all years except five (i.e., 1983, 1985, 1991, 2004, 2014) where it takes a value equal to 1 because of extreme events (e.g., hail, frost) in these years which are not sufficiently reflected in the climate data time series. | *R2*=0.75, *SF*=1.26⋅E-08 |
| 2 | Oranges/ Peloponnese & Western Greece | Yt (kg/stremma) = 407.21 + 22.11\*P8,t + 137.72\*TMAX1,t – 148.22\*TMIN1,t + 184.83\*TMAX5,t – 256.41\*TMIN5,t – 199.23\*TMAX7,t + 351.54\*TAV8,t – 89.02\*TMAX9,t – 1318.48\*Extr  Extr: dummy variable, with a value equal to 0 for all years except the following where it takes a value equal to 1: a) 1987 because of an extreme event (e.g., hail, frost) in this year that is not sufficiently reflected in the climate data time series, and b) 2013 because there was a sharp increase of cultivated areas in this year (which then returned to normal levels) that resulted in a sharp reduction of crop yield. | *R2*=0.84, *SF*=4.32⋅E-08 |
| 3 | Oranges/ Crete | Yt (kg/tree) = 26.07– 7.04\*TMIN11,t-1 + 7.65\*TAV11,t-1 + 31.43\*TMAX2,t +27.07\*TMIN2,t – 60.08\*TAV2,t +13.9\*TMAX4,t – 17.4\*TAV4,t + 9.83\*TMIN6,t – 8.2\*TAV6,t – 18.69\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 2005 where it takes a value equal to 1 as in this year there was a sharp increase in the number of trees (which then returned to normal levels) that resulted in a sharp reduction of crop yield. | *R2*=0.71, *SF*=0.000186 |
| 4 | Lemons/ Peloponnese & Western Greece | Yt (kg/stremma) = 3137.06 + 56.1\*TMIN3,t – 101.48\*TMAX7,t – 491.29\*TMAX8,t – 390.25\*TMIN8,t + 1007.33\*TAV8,t – 90.17\*TMIN9,t – 885.65\*Extr  Extr: dummy variable, with a value equal to 0 for the period 1980-2003 and from 2015 onwards, and a value equal to 1 for the period 2004-2014 when there was a sharp decrease of the yield per tree and per unit area due to the frost of the year 2004 which damaged many lemon trees at the Achaia prefecture in the Peloponnese region. | *R2*=0.9, *SF*=1.1⋅E-11 |
| 5 | Lemons/ Crete | Yt (kg/tree) = 59.25 – 0.026\*P2,t + 10.91\*TMIN4,t – 12.16\*TAV4,t – 10.36\*TMIN5,t + 10.54\*TAV5,t – 0.15\*dfyt + 0.17\*t  t: dummy variable (year), with a value of 0 in the starting year 1980.  dfyt: planting density (number of trees/stremma) | *R2*=0.81, *SF*=2.51⋅E-08 |
| 6 | Mandarins/ Epirus | Yt (kg/stremma) = 5712.85 – 11.611\*P6,t – 3.1026\*P11,t – 223.3\*TAV6,t + 92.7\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.83, *SF*=1.16⋅E-11 |
| 7 | Mandarins / Peloponnese & Western Greece | Yt (kg/stremma) = – 19777.2 – 81.06\*TAV2,t + 161.23\*TMIN3,t + 253.79\*TMAX4,t – 233.01\*TMIN4,t + 1818.305\*TMAX6,t + 833.12\*TMIN6,t – 2805.63\*TAV6,t + 10.55\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.68, *SF*=4.03⋅E-05 |
| 8 | Apples/ Central & Western Macedonia | Yt (kg/stremma) = – 268.77 + 15.53\*P1,t + 1347.11\*TMΑΧ1,t + 1501.79\*TMΙΝ1,t – 3006.19\*TAV1,t + 261.64\*TMIN4,t + 3192.19\*TMΑΧ5,t + 2162.08\*TMΙΝ5,t – 5658.95\*TAV5,t + 1042.99\*d  d: dummy variable, with a value equal to 0 for the period 1980-2010 and equal to 1 from 2011 onwards as there was a very large increase in the number of trees starting in 2011 without a consistent change in cultivated areas, which resulted in an increased production volume and a consequent very large increase of crop yields. | *R2*=0.77, *SF*=5.58⋅E-06 |
| 9 | Apples/ Thessaly | Yt (kg/stremma) = 3854.7 + 1.546\*P2,t – 7.25\*P6,t – 64.2\*TMAX1,t + 462.93\*TMΑΧ4,t – 588.77\*TAV4,t + 371.24\*TMΑΧ5,t – 490.47\*TAV5,t – 140.63\*TMAX6,t – 1033.46\*TMAX8,t – 458.96\*TMIN8,t + 1696.5\*TAV8,t + 869.78\*dfyt  dfyt: dummy variable, with a value equal to 0 for the period 1980-2013 and equal to 1 from 2014 onwards as there was a very sharp increase of the planting density in this latter period. | *R2*=0.83, *SF*=5.474⋅E-06 |
| 10 | Pears/ Central & Western Macedonia | Yt (kg/tree) = 52.86 – 0.07\*P5,t + 2.53\* TMIN1,t – 3.24\*TAV1,t + 1.9\*TMAX3,t – 2.05\*TAV3,t + 6.58\*TMIN5,t – 5.59\*TAV5,t + 9.33\*d – 12.055\*Extr  d: dummy variable, with a value equal to 0 for the period 1980-2013 and equal to 1 from 2014 onwards as there was a very sharp decrease of the number of trees in this latter period which resulted in very large increase of the yield per tree.  Extr: dummy variable, with a value equal to 0 for all years except 2002 and 2003 where it takes a value equal to 1 as in these years there were extreme events (frost in April, hail) which are not sufficiently reflected in the climate data time series. | *R2*=0.78, *SF*=3.418⋅Ε-06 |
| 11 | Pears/ Thessaly | Yt (kg/tree) = 20.45 + 0.083\*P3,t + 0.125\*P6,t – 0.223\*P7,t – 1.3\* TMAX1,t – 1.19\*TMAX2,t + 2.12\*TMAX3,t + 9.64\*TMAX6,t – 12.41\*TAV6,t – 10.98\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 2002 and 2014 where it takes a value equal to 1 as in these years there were extreme events (fruit drop from high winds, frost in December) which are not sufficiently reflected in the climate data time series. | *R2*=0.81, *SF*=5.85⋅Ε-07 |
| 12 | Pears/ Peloponnese & Western Greece | Yt (kg/stremma) = 2626.68 + 419.103\*TMIN12,t-1 – 431.07\*TAV12,t-1 – 852.55\* TMAX1,t – 1022.7\*TMIN1,t + 1860.63\*TAV1,t + 166.54\*TMIN4,t + 1199.76\*TMAX6,t + 458.85\*TMIN6,t – 1840.6\* TAV6,t | *R2*=0.88, *SF*=2.26⋅Ε-09 |
| 13 | Peaches/ Central Macedonia | Yt (kg/tree) = 57.29 + 0.077\*P1,t + 0.1\* P4,t – 0.15\* P6,t + 3.93\*TMAX8,t-1 + 3.89\*TMAX9,t-1 – 4.68\*TMAX1,t – 1.89\*TMIN2,t + 3.4\*TAV4,t – 12.03\*TMAX6,t + 26.32\*TMAX7,t – 27.51\*TAV7,t + 28.12\*TMIN8,t – 23.33\*TAV8,t | *R2*=0.8, *SF*=6.77⋅Ε 05 |
| 14 | Peaches / Thessaly | Yt (kg/stremma) = – 2845.7 + 8.07\*P5,t – 1103.15\*TΜΑΧ12,t-1 + 2338.7\*TAV12,t-1 – 1140.5\*TΜΙΝ12,t-1 – 107.91\*TΜΙΝ2,t + 211.13\*TMAX4,t + 1063.5\*TMAX5,t – 1430\*TAV5,t + 37.69\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.73, *SF*=3.32⋅Ε-05 |
| 15 | Apricots/ Central Macedonia | Yt (kg/stremma) = 2625.96 – 60.74\* TMAX2,t – 158.81\*TMAX3,t + 265.4\*TAV3,t – 80.81\*TMAX5,t – 126.06\*TMAX6,t + 104.17\*TMAX7,t + 17.37\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.69, *SF*=3.11⋅Ε-05 |
| 16 | Apricots / Thessaly | Yt (kg/stremma) = 3372.4 + 194.9\*TMAX6,t-1 – 479.4\*TMIN6,t-1 – 177.2\* TMAX2,t + 121.71\*TMIN2,t + 103.93\*TMAX3,t + 172.39\*TMAX4,t – 232.9\*TMIN4,t – 180.0\*TMIN5,t + 35.737\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.78, *SF*=8.064⋅Ε-06 |
| 17 | Apricots / Peloponnese | Yt (kg/stremma) = -2559.58 + 1386.56\*TMΑΧ9,t-1 + 858.24\*TMΙΝ9,t-1 – 2330.88\* TAV9,t-1 + 81.51\*TMIN10,t-1 – 587.47\*TMAX1,t + 1184.39\*TAV1,t – 621.82\*TMIN1,t – 118.75\*TMIN2,t + 171.22\*TMIN4,t + 688.32\*TMIN5,t – 2145.4\*TAV5,t + 1302.67\*TMAX5,t | *R2*=0.77, *SF*=0.00023 |
| 18 | Cherries/ Central & Western Macedonia | Yt (kg/stremma) = 173.12 – 161.72\*TMAX11,t-1 – 127.73\*TMIN11,t-1 + 296.5\* TAV11,t-1 – 72.58\*TAV12,t-1 + 68.28\*TMAX12,t-1 + 49.51\*TMAX5,t – 62.42\*TMIN5,t – 117.34\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 1982, 1983 and 1991 where it takes a value equal to 1 as in these years crop yields were extremely low, which is indicative of extreme events not sufficiently reflected in the climate data time series. | *R2*=0.71, *SF*=0.0001 |
| 19 | Cherries / Thessaly | Yt (kg/stremma) = 2325.88 + 468.45\*TMAX11,t-1 – 1039.06\*TAV11,t-1 + 560.17\* TMIN11,t-1 – 33.11\*TMAX1,t + 62.34\*TMAX5,t + 308.59\*TMAX6,t – 677.9\*TAV6,t – 22.78\*t – 494.48\*Extr  t: dummy variable (year), with a value of 0 in the starting year 1980.  Extr: dummy variable, with a value equal to 0 for all years except 1991 where it takes a value equal to 1 as in this year there was a sharp decrease of crop yield, which is indicative of an extreme event that is not sufficiently reflected in the climate data time series. | *R2*=0.87, *SF*=4.572Ε-08 |
| 20 | Almonds/Eastern Macedonia & Thrace | Yt (kg/tree) = 70.88 + 0.027\*P3,t – 0.094\*P8,t – 0.953\*TAV2,t + 7.325\*TMIN4,t – 7.3\* TAV4,t – 2.515\*TAV6,t + 11.98\*TMIN7,t – 10.38\*TAV7,t – 12.82\*TMAX9,t + 23.79\*TAV9,t + 0.48\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.84, *SF*=3.99⋅Ε-06 |
| 21 | Almonds / Central & Western Macedonia | Yt (kg/tree) = 12.66 – 1.398\*TMIN12,t-1 + 1.397\*TAV12,t-1 + 0.96\*TMΙΝ3,t – 0.84\*TAV3,t – 0.54\* TMIN6,t + 0.14\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.82, *SF*=4.14⋅Ε-09 |
| 22 | Almonds / Thessaly | Yt (kg/tree) = 1.49 + 0.02\*P6,t + 4.087\*TMAX5,t – 6.69\*TAV5,t + 2.08\*TMIN5,t – 3.33\*Extr + 0.11\*t  Extr: dummy variable, with a value equal to 0 for all years except 1987 and 1998 where it takes a value equal to 1 as in these years crop yields were extremely low, which is indicative of extreme events not sufficiently reflected in the climate data time series.  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.76, *SF*=1.6⋅Ε-07 |
| 23 | Almonds / Στερεά Ελλάδα | Yt (kg/tree) = 1.78 + 0.008\*P11,t-1 – 0.29\*TMAX1,t + 0.9\*TMAX3,t – 1.057\* TAV3,t + 0.065\*t + 3.54\*d  d: dummy variable, with a value equal to 0 for the period 1980-2014 and equal to 1 from 2015 onwards as there was a very large increase of the yield per tree in the latter period (average annual increase by 21-23%) which cannot be explained solely by climatic conditions.  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.86, *SF*=3.32⋅Ε-10 |
| 24 | Walnuts/ Eastern Macedonia & Thrace | Yt (kg/stremma) = 1057.79 + 106.4\*TMIN1,t - 110.85\*TAV1,t – 53.537\* TMIN4,t + 51.6\*TMAX4,t – 50.815\* TMIN8,t + 37.02\* TAV10,t - 9.176\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.88, *SF*=4.63⋅Ε-11 |
| 25 | Walnuts / Central & Western Macedonia | Yt (kg/stremma) = 1671.24 – 0.903\*P1,t – 116.55\* TMAX1,t + 129.18\* TAV1,t – 43.718\* TMINI2,t + 32.578\* TAV2,t + 17.09\* TMINI4,t – 29.62\* TMINI7,t – 33.95\* TAV8,t + 15.44\* TMIN10,t | *R2*=0.82, *SF*=9.44⋅E-08 |
| 26 | Walnuts / Στερεά Ελλάδα | Yt (kg/tree) = –57.95 + 0.05\*P5,t + 0.12\* P7,t + 5.51\* TMAX5,t – 6.17\* TAV5,t + 1.66\* TMIN6,t + 6.77\* TMAX7,t – 7.67\* TAV7,t | *R2*=0.74, *SF*=1.121⋅E-06 |
| 27 | Walnuts / Thessaly | Yt (kg/stremma) = -218.47 + 0.515\*P3,t + 1.314\*P6,t – 9.62\* TAV2,t – 149.27\* TAV6,t + 130.18\* TMAX6,t + 90.64\*d  d: dummy variable, with a value equal to 0 for the period 1980-2006 and a value equal to 1 from 2011 onwards as there was a very large increase of crop yield in the latter period (average annual increase by ~11%) which cannot be explained solely by climatic conditions. | *R2*=0.76, *SF*=1.37⋅E-07 |
| 28 | Walnuts / Peloponnese & Western Greece | Yt (kg/stremma) = 334.85 – 0.186\*P1,t – 0.449\* P5,t + 0.615\* P8,t – 5.242\* TMAX2,t + 58.91\* TMAX5,t + 55.07\* TMIN5,t – 113.86\* TAV5,t + 15.47\* TMAX6,t – 18.8\* TAV7,t | *R2*=0.81, *SF*=9.63⋅E-07 |
| 29 | Chestnuts/ Central & Western Macedonia | Yt (kg/tree) = 29.27 + 0.026\*P4,t + 0.037\*P9,t – 0.93\*TMAX6,t + 12.08\*d  d: dummy variable, with a value equal to 0 for the period 1980-2015 and a value equal to 1 from 2016 onwards as there was a very large increase of the number of trees and a decrease of cultivated areas in the latter period which together resulted in a sharp increase of the yield per tree. | *R2*=0.79, *SF*=8.25⋅Ε-10 |
| 30 | Chestnuts / Thessaly | Yt (kg/stremma) = 1963.93 + 1.49\*P5,t + 2.51\*P8,t – 63.04\*TAV7,t – 311.26\*d  d: dummy variable, with a value equal to 0 for the period 1980-1989 and a value equal to 1 from 1990 onwards as there was a very large decrease of crop yields during the latter period which cannot be explained solely by climatic conditions. | *R2*=0.79, *SF*=1.57⋅Ε-9 |
| 31 | Chestnuts / Peloponnese & Western Greece | Yt (kg/tree) = 14.2– 0.7\*TMIN7,t  + 0.46\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.91, *SF*=1.56⋅Ε-16 |
| 32 | Chestnuts / Crete | Yt (kg/tree) = 54.28 – 1.936\*TAV6,t + 2.187\*TAV8,t – 2.642\*TMIN9,t + 8.8\*d  d: dummy variable, with a value equal to 0 for the period 1980-2015 and a value equal to 1 from 2016 onwards as there was a very large decrease of the planting density from the year 2016 onwards. | *R2*=0.64, *SF*=1.67⋅Ε-06 |
| 33 | Olives/ Eastern Macedonia & Thrace | Yt (kg/stremma) = –413.55 + 2.44\*P6,t + 168.4\* TMIN12,t-1 – 142.83\* TAV12,t-1 – 50.83\*TMAX5,t + 449.11\*TMAX6,t – 419.66\* TAV6,t + 7.85\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.9, *SF*=4.13⋅E-12 |
| 34 | Olives / Central Macedonia | Yt (kg/stremma) = –130.75 + 3.007\*P8,t + 0.91\* P9,t + 54.65\*TMAX12,t-1 – 44.53\*TAV12,t-1 + 87.39\*TMIN6,t – 87.17\*TAV6,t + 123.33\*TAV8,t – 104.99\*TMIN8,t – 22.36\*TMAX9,t – 92.88\*Extr + 4.337\*t  t: dummy variable (year), with a value of 0 in the starting year 1980.  Extr: dummy variable, with a value equal to 0 for all years except 1983, 1985, 2002 and 2013 where it takes a value equal to 1 as in these years there was a very low production without any significant changes in the areas cultivated or in the number of trees (which is indicative of extreme events not sufficiently reflected in the climate data series ). | *R2*=0.92, *SF*=4.67⋅E-10 |
| 35 | Ελιά / Thessaly | Yt (kg/stremma) = –1022.25 + 1.55\*P9,t-1 + 2.2\* P3,t – 55.81\*TMIN3,t + 77.58\*TAV3,t + 168.75\*TMAX5,t – 217.38\*TAV5,t + 88.03\* TMIN6,t – 54.59\*TMIN7,t – 15.5\*TMIN12,t | *R2*=0.84, *SF*=6.67⋅E-08 |
| 36 | Olives / Central Greece | Yt (kg/stremma) = 437.25 + 44.3\*TMAX12,t-1 – 52.78\*TAV12,t-1 – 9.2\*TAV1,t – 141.6\*TMAX2,t – 116.01\*TMIN2,t + 258.91\*TAV2,t – 10.39\*TMAX4,t + 33.94\*TMIN9,t – 29.07\*TAV9,t – 114.99\*Extr + 3.22\*t  t: dummy variable (year), with a value of 0 in the starting year 1980.  Extr: dummy variable, with a value equal to 0 for all years except 1981 and 1987 where it takes a value equal to 1 as in these years there was a very low production without any significant changes in the areas cultivated or in the number of trees (which is indicative of extreme events not sufficiently reflected in the climate data series ). | *R2*=0.78, *SF*=2.97⋅E-05 |
| 37 | Olives / Ionian Islands | Yt (kg/tree) = 87.62 + 0.04\*P9,t + 27.06\*ΤΜΑΧ4,t + 17.77\*TMΙΝ4,t – 49.016\*TAV4,t – 28.26\*TMAX5,t + 29.3\*TAV5,t + 2.36\* TMIN9,t – 2.46\*TMIN10,t + 23.24\*TMAX11,t + 21.07\*TMIN11,t – 44.2\*TAV11,t | *R2*=0.77, *SF*=4.57⋅E-05 |
| 38 | Olives / Peloponnese & Western Greece | Yt (kg/tree) = 10.17 – 0.024\*P2,t + 0.02\* ∑P7-11,t – 0.799\*ΤΜΙΝ1,t – 18.41\*TAV5,t + 8.97\*ΤΜΙΝ5,t +9.61\*TMAX5,t + 0.17\*t  ∑P7-11,t : sum of rainfall in the period July-November of year t.  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.67, *SF*=4.88⋅E-05 |
| 39 | Olives / Crete | Yt (kg/tree) = 14.18 + 0.033\*P1,t + 8.33\*TMAX1,t + 10.24\*TMIN1,t – 18.83\*TAV1,t + 12.12\*TMAX6,t + 10.003\*TMIN6,t – 22.07\*TAV6,t – 7.13\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 1981, 1983, 1990 and 2013 where it takes a value equal to 1 as in these years there was a very low production (a production level that was not recorded in any other year of the time series), which is indicative of extreme events not sufficiently reflected in the climate data series. | *R2*=0.74, *SF*=5.37⋅E-06 |
| 40 | Oat/ Central & Western Macedonia | Yt (kg/stremma) = 491.57 + 0.266\*P11,t-1 + 0.173\* P12,t-1 – 16.5\*TMAX5,t + 2.04\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.55, *SF*=5.16⋅E-05 |
| 41 | Oat / Thessaly | Yt (kg/stremma) = 449.48 + 7.48\*TAV1,t – 59.92\*TMAX3,t – 70.67\*TΜΙΝ3,t + 130.51\*TAV3,t – 82.2\*TMAX4,t + 149.52\*TAV4,t – 55.43\*TMIN4,t – 16.16\*TAV5,t – 57.76\*Extr  Extr: dummy variable, with a value equal to 0 for all years of the period 1980-2019 except 1983 and 1990 where it takes a value equal to 1 as in these years there was a very large decrease of production not consistent with the recorded changes in cultivated areas, which led to a sharp decrease of crop yields (indicative of extreme events not sufficiently reflected in the climate data series ). | *R2*=0.74, *SF*=2.42⋅E-05 |
| 42 | Oat / Central Greece | Yt (kg/stremma) = 157.33 + 0.24\*P6,t + 1.32\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.59, *SF*=6.55⋅E-07 |
| 43 | Oat / Peloponnese | Yt (kg/stremma) = –59.83 + 0.47\*P3,t + 0.88\*P6,t + 33.44\*TMAX3,t – 28.77\*TAV3,t – 89.33\*Extr  Extr: dummy variable, with a value equal to 0 for all years of the period 1980-2019 except 1990 where it takes a value equal to 1 as in this year there was a very large decrease of production not consistent with the recorded changes in cultivated areas, which led to a sharp decrease of crop yields (indicative of extreme events not sufficiently reflected in the climate data series ). | *R2*=0.64, *SF*=6.78⋅E-06 |
| 44 | Oat / Western Greece | Yt (kg/stremma) = 112.96 + 0.09\*P3,t + 6.74\*TMAX11,t-1 – 7.87\*TAV11,t-1 + 2.98\*TMAX12,t-1 + 31.87\*d  d: dummy variable, with a value equal to 0 for the period 1980-1988 and a value equal to 1 from 1989 onwards ascrop yields in almost all years of the latter period were 2-27% higher compared to the maximum yield of the former period (which indicates a systemic increase of crop yields because of non-climatic factors). | *R2*=0.81, *SF*=1.01⋅E-09 |
| 45 | Oat / Ionian Islands | Yt (kg/stremma) = 313.33 – 25.4\*TMAX11,t-1 + 23.6\*TMIN11,t-1 – 5.596\*TMAX5,t + 2.254\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.73, *SF*=3.67⋅E-08 |
| 46 | Rye/ Eastern Macedonia & Thrace | Yt (kg/stremma) = 169.9 + 0.453\*P4,t – 0.556\*P6,t + 9.84\*TAV4,t – 42.04\*TMAX6,t + 47.87\*TΜΙΝ6,t + 2.573\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.77, *SF*=3.36⋅E-08 |
| 47 | Rye/ Central Macedonia | Yt (kg/stremma) = 256.38 + 0.73\*P5,t + 0.76\*P7,t + 8.73\*TMIN11,t-1 – 10.86\*TMAX5,t + 64.28\*TMAX6,t – 89.42\*TAV6,t + 18.43\*TMIN7,t – 65.42\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 1983 and 1985 where it takes a value equal to 1 as in these years there was a very sharp increase of cultivated areas with a much lower increase of production volumes, resulting to a sharp reduction of crop yields. | *R2*=0.72, *SF*=1.6⋅E-05 |
| 48 | Rye/ Western Macedonia | Yt (kg/stremma) = 287.98 + 0.43\*P5,t + 22.88\*TMIN12,t-1 – 21.25\*TAV12,t-1 – 10.59\*TMIN2,t + 12.25\*TAV2,t + 14.57\*TMIN6,t – 13.49\*TAV6,t – 123.81\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 2003 where it takes a value equal to 1 as in this year there was a very low production (a production level that was not recorded in another year of the time series), indicating the occurrence of an extreme event not sufficiently reflected in the climate data series. | *R2*=0.82, *SF*=702⋅E-08 |
| 49 | Rye/ Thessaly | Yt (kg/stremma) = 126.64 + 76\*TMAX5,t – 126.64\*TAV5,t + 43.18\*TMIN5,t + 1.427\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.53, *SF*=9.51⋅E-05 |
| 50 | Tobacco/ Eastern Macedonia & Thrace | Yt (kg/stremma) = 213.1 + 0.164\*P3,t + 0.238\*P5,t – 0.562\*P6,t + 0.333\*P7,t + 38.28\*TMΙΝ6,t – 38.31\*TAV6,t + 12.87\*TΜΑΧ9,t – 17.21\*TΜΙΝ9,t + 1.644\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.81, *SF*=1.97⋅E-07 |
| 51 | Tobacco / Central Macedonia | Yt (kg/stremma) = 119.57 + 0.15\*P4,t – 0.28\*P7,t + 4.54\*TMAX6,t + 22.55\*TMIN8,t – 75.68\*d + 3.79\*t  d: dummy variable, with a value equal to 0 for the period 1980-2013 a value equal to 1 from 2014 onwards as in the latter period there is a continuous decrease of cultivated areas and production volumes (with the rate of decrease in the latter much higher than that of the former), which is indicative of extreme events and other adverse non-climatic factors.  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.91, *SF*=3.83⋅E-13 |
| 52 | Tobacco / Thessaly | Yt (kg/stremma) = 370.92 – 0.38\*P7,t – 10.68\*TAV9,t + 5.82\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.91, *SF*=7.68⋅E-17 |
| 53 | Lentils/ Central & Western Macedonia | Yt (kg/stremma) = –28.8 + 0.17\*P10,t-1 + 0.2\*P11,t-1 + 0.244\*P4,t + 0.237\*P5,t – 0.232\*P6,t + 2.186\*TMAX3,t – 2.81\*DTMAX56,t + 14.98\*TMAX7,t – 15.65\*TAV7,t  DTMax56,t: TMAX6,t – TMAX5,t | *R2*=0.75, *SF*=1.33⋅E-05 |
| 54 | Lentils / Thessaly | Yt (kg/stremma) = –221.12 + 0.42\*P10,t-1 – 0.6\*P5,t + 38.14\*TMAX10,t-1 – 40.27\*TAV10,t-1 – 9.55\*TMAX12,t-1 + 16.86\*TMIN12,t-1 + 40.25\*TAV4,t – 37.22\*TMIN4,t – 34.44\*TMIN5,t + 13.66\*TMAX6,t – 56.78\*Extr  Extr: dummy variable, with a value equal to 0 for all years of the period 1980-2019 except 1982 and 1990 where it takes a value equal to 1 as crop yields in these years were very low (a level not recorded in another year of the period) which is indicative of an extreme event not sufficiently reflected in the climate data series. | *R2*=0.77, *SF*=3.85⋅E-05 |
| 55 | Lentils / Central Greece | Yt (kg/stremma) = 88.39 + 0.15\*P10,t-1 + 0.3\*P3,t + 38.56\*TMAX2,t + 44.22\*TMIN2,t – 90.01\*TAV2,t + 5.68\*TAV3,t | *R2*=0.64, *SF*=2.98⋅E-05 |
| 56 | Watermelons/ Central Macedonia | Yt (kg/stremma) = 1369.88 – 4.95\*P7,t – 489.15\*TMAX7,t + 642.59\*TAV7,t + 32.68\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.73, *SF*=3.53⋅E-08 |
| 57 | Watermelons / Thessaly | Yt (kg/stremma) = 828.37 + 3.31\*P2,t – 784.09\*TMAX6,t – 1030.6\*TMIN6,t + 1852.75\*TAV6,t + 41.13\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.77, *SF*=7.88⋅E-09 |
| 58 | Watermelons / Central Greece | Yt (kg/stremma) = –422.64 + 11.91\*P4,t + 21.72\*P6,t + 159.94\*TMAX4,t + 11.39\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.66, *SF*=5.64⋅E-07 |
| 59 | Watermelons / Peloponnese & Western Greece | Yt (kg/stremma) = 7152.98 – 666.61\*ΤΜΑΧ5,t + 757.17\*TAV5,t + 998.56\*TMAX6,t – 1056.29\*TAV6,t – 191.3\*TΜΑΧ7,t + 36.718\*t  t: dummy variable (έτος), με τιμή 0 για το 1980 | *R2*=0.61, *SF*=5.66⋅E-05 |
| 60 | Watermelons / South Aegean | Yt (kg/stremma) = 369.53 + 332.38\*P7,t – 561.16\*TMAX5,t + 695.33\*TMIN5,t | *R2*=0.78, *SF*=9.94⋅E-11 |
| 61 | Melons/ Eastern Macedonia & Thrace | Yt (kg/stremma) = –2330.4 + 6.39\*P7,t – 857.17\*TMIN6,t + 889.94\*TAV6,t – 790.49\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 1983, 1985, 1986 and 1989 where it takes a value equal to 1 as in crop yields in these years were very low (a level not recorded in another year of the period) which is indicative of extreme events not sufficiently reflected in the climate data series. | *R2*=0.63, *SF*=2.26⋅E-06 |
| 62 | Melons / Central & Western Macedonia | Yt (kg/stremma) = 240.79 – 708.21\*TMAX5,t + 1320\*TAV5,t – 533.77\*TMIN5,t + 23.23\*t  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.75, *SF*=7.74⋅E-09 |
| 63 | Melons / Thessaly | Yt (kg/stremma) = 4732.69 – 10.5\*P6,t – 696.26\*TMAX6,t + 797.35\*TAV6,t + 238.09\*TMAX9,t – 332.69\*TAV9,t – 675.88\*Extr + 40.11\*t  Extr: dummy variable, with a value equal to 0 for all years except 1983 where it takes a value equal to 1 as in this year the crop yield was very low (a level not recorded in another year of the period) which is indicative of an extreme event not sufficiently reflected in the climate data series.  t: dummy variable (year), with a value of 0 in the starting year 1980. | *R2*=0.86, *SF*=1.57⋅E-10 |
| 64 | Melons / Central Greece | Yt (kg/stremma) = 1683.48 + 16.99\*P6,t + 7.15\*t – 897.4\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 1987 where it takes a value equal to 1 as in this year the crop yield was very low (a level not recorded in another year of the period) which is indicative of an extreme event not sufficiently reflected in the climate data series.  t: dummy variable (έτος), με τιμή 0 για το 1980 | *R2*=0.66, *SF*=1.03⋅E-07 |
| 65 | Melons / Peloponnese & Western Greece | Yt (kg/stremma) = –167.11 + 5.59\*P5,t – 528.04\*TMIN5,t + 507.79\*TAV5,t + 14.55\*t – 1075.24\*Extr  t: dummy variable (year), with a value of 0 in the starting year 1980.  Extr: dummy variable, with a value equal to 0 for all years except 2018 where it takes a value equal to 1 as in this year there was a very large decrease of production volume, probably because of extreme events not sufficiently reflected in the climate data series , which led to a sharp decrease of crop yield. | *R2*=0.64, *SF*=6.46⋅E-06 |
| 66 | Melons / Crete | Yt (kg/stremma) = 488.09 + 8.72\*P5,t + 4.06\*P9,t + 1112.96\*TMAX5,t + 705.106\*TMIN5,t – 1826.29\*TAV5,t – 378.955\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 1980 and 1981 where it takes a value equal to 1 as in these years there was a very large decrease of production volume, probably because of extreme events not sufficiently reflected in the climate data series ,, which led to a sharp decrease of crop yields. | *R2*=0.66, *SF*=9.62⋅E-06 |
| 67 | Cucumbers/ Thessaly | Yt (kg/stremma) = 5839.85 – 779.04\*TMAX8,t + 1723.96\*TAV8,t – 1041.99\*TMIN8,t – 99.14\*TMAX9,t | *R2*=0.5, *SF*=0.0013 |
| 68 | Cucumbers / Central Greece | Yt (kg/stremma) = 3523.34 + 17.08\*P6,t – 9.77\*P9,t – 112.99\*TMAX6,t – 1425.64\*TMAX7,t – 828.05\*TMΙΝ7,t + 2410.32\*TAV7,t – 197.18\*TMAX9,t + 231.89\*TMΙΝ9,t | *R2*=0.76, *SF*=1.39⋅E-06 |
| 69 | Cucumbers / Peloponnese & Western Greece | Yt (kg/stremma) = –93.94 + 2.59\*P4,t + 4.15\*P5,t + 12.39\*P7,t – 6.41\*P8,t – 2.2\*P9,t – 387.16\*TΜΑΧ3,t + 661.4\*TAV3,t – 363.68\*TΜIN3,t + 108.79\*TΜAX5,t – 44.899\*TΜAX6,t + 91.72\*TΜAX7,t – 75.24\*TAV8,t + 397.16\*d  d: dummy variable, with a value equal to 0 for the period 1980-2006 and a value equal to 1 from 2011 onwards as in the latter period there is a sharp decrease of cultivated areas and to a much lower extent of production volumes, resulting to a significant increase of crop yields. | *R2*=0.89, *SF*=6.5⋅E-06 |
| 70 | Cucumbers / Crete | Yt (kg/stremma) = 189.6 + 22.33\*P8,t + 1878.15\*TMAX8,t – 2038.79\*TAV8,t + 2681.23\*d  d: dummy variable, with a value equal to 0 for the period 1980-2013 and a value equal to 1 from 2014 onwards as in this latter period there was a sharp increase of cultivated areas and to a much larger extent of production volumes, resulting in a sharp increase of crop yields compared to the former period. | *R2*=0.82, *SF*=2.065⋅E-09 |
| 71 | Cucumbers / Attica | Yt (kg/stremma) = –782.22 + 1174.2\*TMAX6,t – 1287.09\*TAV6,t – 602.22\*TMIN9,t + 529.19\*TAV9,t + 1402.14\*d  d: dummy variable, with a value equal to 0 for the period 1980-1994 and a value equal to 1 from 1995 onwards as in the latter period there is a significant improvement of crop yields (except in year 2002) by 9-90% compared to the average yield and by 5-84% compared to the median yield of the former period, which is probably due largely to non-climatic factors. | *R2*=0.73, *SF*=1.68⋅E-06 |
| 72 | Cucumbers / Ionian Islands | Yt (kg/stremma) = 608.7 + 1.53\*P4,t + 5.71\*P6,t + 6.86\*P7,t – 41.2\*TMAX3,t + 49.77\*TAV5,t – 374.19\*TMAX7,t – 309.47\*TMIN7,t + 703.11\*TAV7,t + 603.48\*d  d: dummy variable, with a value equal to 0 for the period 1980-2014 and a value equal to 1 from 2015 onwards as in the latter period there is a significant improvement of crop yields which cannot be justified solely by changes in climatic conditions. | *R2*=0.93, *SF*=1.65⋅E-10 |
| 73 | Cucumbers / South Aegean | Yt (kg/stremma) = 899.17 + 2.984\*P3,t + 928.37\*TMΙΝ3,t – 2130.99\*TΜΑΧ6,t – 2373.67\*TΜΙΝ6,t + 4542.31\*TAV6,t – 161.71\*Extr  Extr: dummy variable, with a value equal to 0 for all years except 1994 and 2000 where it takes a value equal to 1 as in these years production volumes were very low (levels that were not recorded in another year of the period ), which is indicative of an extreme event not sufficiently reflected in the climate data series. | *R2*=0.6, *SF*=0.0017 |
| 74 | Alfafa/ Eastern Macedonia & Thrace | Yt (kg/stremma) = 1500.847 – 0.99\*P7,t + 100.41\*TMΙΝ6,t – 71.35\*TΜΑΧ6,t – 24.00\*TAV8,t + 182.74\*d  d: dummy variable, with a value equal to 0 for the period 1980-2011 and a value equal to 1 from 2012 onwards as in the latter period there is a systematic increase of crop yields at levels much higher than those in the former period, which is indicative of the positive contribution of non-climatic factors (e.g. extension/improvement of irrigation). | *R2*=0.66, *SF*=2.71⋅E-06 |
| 75 | Alfafa / Central & Western Macedonia | Yt (kg/stremma) = 1387.09 + 0.63\*P5,t – 0.41\*P6,t – 0.57\*P9,t + 144.73\*TMAX5,t – 161.12\*TAV5,t – 211.25\*TΜAX8,t – 157.92\*TΜIN8,t + 394.82\*TAV8,t – 21.01\*TAV9,t + 25.92\*TMIN10,t + 43.06\*TMAX11,t – 46.4\*TAV11,t | *R2*=0.73, *SF*=0.00083 |
| 76 | Alfafa / Thessaly | Yt (kg/stremma) = 867.93 + 0.8\*P3,t – 1.24\*P5,t – 1.29\*P7,t + 16.82\*TMAX3,t + 4.125\*t – 223.57\*Extr  t: dummy variable (year), with a value of 0 in the starting year 1980.  Extr: dummy variable, with a value equal to 0 for all years except 1988 where it takes a value equal to 1 as crop yields in this year were 11-30% lower than those on all other years, which is indicative of an extreme event not sufficiently reflected in the climate data series. | *R2*=0.81, *SF*=2.92⋅E-09 |
| 77 | Alfafa / Central Greece | Yt (kg/stremma) = 672.97 – 0.45\*P10,t + 13.42\*TMΙΝ3,t – 75.55\*TΜIN5,t + 42.87\*TAV5,t + 37.22\*TMIN8,t + 26.43\*TMAX9,t – 48.19\*TMIN9,t + 7.66\*t – 90.99\*Extr  t: dummy variable (year), with a value of 0 in the starting year 1980.  Extr: dummy variable, with a value equal to 0 for all years except 1980, 1982 and 1985 where it takes a value equal to 1 as crop yields in these years were much lower than in the all the rest, which is indicative of extreme events not sufficiently reflected in the climate data series. | *R2*=0.88, *SF*=5.24⋅E-10 |
| 78 | Alfafa / Western Greece | Yt (kg/stremma) = 693.66 – 2.45\*P5,t + 41.25\*TMAX3,t – 130.75\*TMIN4,t + 101.5\*TAV4,t – 34.99\*TΜAX5,t + 38.07\*TAV6,t – 40.09\*TMIN7,t + 39.29\*TMIN9,t – 5.94\*t – 149.82\*Extr  t: dummy variable (year t), with a value of 0 in the starting year 1980.  Extr: dummy variable, with a value equal to 0 for all years except 1985 and 1989 1985 where it takes a value equal to 1 as crop yields in these years were much lower than in the all the rest, which is indicative of extreme events not sufficiently reflected in the climate data series. | *R2*=0.75, *SF*=8.04⋅E-05 |

1 1 stremma = 0.1 Ha; t: year; TMAX*i,t*: Mean maximum temperature (in oC) of month *i* in year *t*; TMIN*i,t*: Mean minimum temperature (in oC) of month *i* in year *t*; TAV*i,t*: Average temperature (in oC) of month *i* in year *t*.

2 SF: significance F

**Table S2**. Threshold values of climatic indicators associated with crop damage from extreme weather events.

| Index No. | Threshold values of climatic indicators1 | Time period of the year (day/month) | Crop |
| --- | --- | --- | --- |
| D1 | Number of days with a daily Fire Weather Index > 45 | 01/01 - 31/12 | All crops |
| D2 | Number of days with average daily wind speed > 10m/s | 01/01 - 31/12 | All crops |
| D3 | Daily (24-hour) rainfall > 30mm | 01/04 - 15/10 | Cotton |
| D4 | Daily (24-hour) rainfall > 30mm | 01/04 - 31/08 | Maize |
| D5 | Daily (24-hour) rainfall > 30mm | 01/02 - 31/10 | Olives |
| D6 | Daily (24-hour) rainfall > 30mm | 01/02 - 15/09 | Peaches, nectarines, apricots, cherries, plums, almonds, nuts |
| D7 | Daily (24-hour) rainfall > 30mm | 01/03 - 31/10 | Citrus fruits |
| D8 | Daily (24-hour) rainfall > 30mm | 15/02 - 31/08 | Apples, pears, grapes |
| D9 | Daily (24-hour) rainfall > 30mm | 15/03 - 15/06 | Melons, watermelons |
| D10 | Daily (24-hour) rainfall > 30mm | 01/05 - 15/10 | Kiwi |
| D11 | Daily (24-hour) rainfall > 30mm | 15/01 - 15/09 | Potatoes |
| D12 | Daily (24-hour) rainfall > 30mm | 01/03 - 30/09 | Tomatoes |
| D13 | Daily (24-hour) rainfall > 30mm | 15/04 - 15/08 | Tobacco |
| D14 | Daily (24-hour) rainfall > 30mm | 01/01 - 15/04 | Fodder plants |
| D15 | Daily (24-hour) rainfall > 30mm | 15/10 - 31/12 | Fodder plants |
| D16 | Daily (24-hour) rainfall > 30mm | 01/01 - 31/12 | Vegetables, cereals, legumes, wheat |
| D17 | Number of 3 consecutive days with Tmax > 35°C | 01/04 - 15/10 | Cotton |
| D18 | Number of 3 consecutive days with Tmax > 25°C | 15/01 - 28/02 | Almonds, nuts |
| D19 | Number of 3 consecutive days with Tmax > 28°C | 15/03 - 15/05 | Kiwi |
| D20 | Number of 3 consecutive days with Tmax > 28°C | 01/01 - 31/03 | Cereals |
| D21 | Number of 3 consecutive days with Tmax > 28°C | 01/11 - 31/12 | Cereals |
| D22 | Number of 3 consecutive days with Tmax > 30°C | 01/01 - 31/03 | Wheat |
| D23 | Number of 3 consecutive days with Tmax > 30°C | 15/11 - 31/12 | Wheat |
| D24 | Number of 3 consecutive days with Tmax > 30°C | 01/03 - 31/05 | Tomatoes |
| D25 | Number of 3 consecutive days with Tmax > 32°C | 15/04 - 15/08 | Tobacco |
| D26 | Number of 3 consecutive days with Tmax > 35°C | 01/04 - 30/06 | Wheat |
| D27 | Number of 3 consecutive days with Tmax > 35°C | 01/04 - 30/08 | Maize |
| D28 | Number of 3 consecutive days with Tmax > 35°C | 01/01 - 31/12 | Olives |
| D29 | Number of 3 consecutive days with Tmax > 35°C | 01/05 - 31/12 | Peaches, nectarines, apricots, cherries, plums |
| D30 | Number of 3 consecutive days with Tmax > 35°C | 01/01 - 28/02 | Citrus fruits |
| D31 | Number of 3 consecutive days with Tmax > 35°C | 16/05 - 31/12 | Citrus fruits |
| D32 | Number of 3 consecutive days with Tmax > 35°C | 01/04 - 31/10 | Apples, pears, grapes, cereals |
| D33 | Number of 3 consecutive days with Tmax > 35°C | 01/03 - 31/10 | Almonds, nuts |
| D34 | Number of 3 consecutive days with Tmax > 35°C | 16/05 - 30/11 | Kiwi |
| D35 | Number of 3 consecutive days with Tmax > 35°C | 16/09 - 31/12 | Vegetables |
| D36 | Number of 3 consecutive days with Tmax > 35°C | 01/01 - 31/01 | Vegetables |
| D37 | Number of 3 consecutive days with Tmax > 36°C | 01/01 - 15/04 | Fodder plants |
| D38 | Number of 3 consecutive days with Tmax > 36°C | 15/10 - 31/12 | Fodder plants |
| D39 | Number of 3 consecutive days with Tmax > 38°C | 01/06 - 30/09 | Tomatoes |
| D40 | Number of 3 consecutive days with Tmax > 40°C | 01/04 - 15/09 | Vegetables |
| D41 | Number of 3 consecutive days with Tmax > 25°C | 01/01 - 30/04 | Peaches, nectarines, apricots, cherries, plums |
| D42 | Number of 3 consecutive days with Tmax > 25°C | 01/03 - 15/05 | Citrus fruits |
| D43 | Number of 3 consecutive days with Tmax > 25°C | 15/02 - 31/03 | Apples, pears, grapes |
| D44 | Number of 3 consecutive days with Tmax > 25°C | 15/01 - 15/02 | Potatoes |
| D45 | Number of 3 consecutive days with Tmax > 30°C | 16/02 - 30/04 | Potatoes |
| D46 | Number of 3 consecutive days with Tmax > 30°C | 01/02 - 31/03 | Vegetables |
| D47 | Number of 3 consecutive days with Tmax > 32°C | 01/01 - 31/12 | Legumes |
| D48 | Number of 3 consecutive days with Tmax > 35°C | 15/03 - 15/09 | Melons, watermelons |
| D49 | Number of 3 consecutive days with Tmax > 35°C | 01/05 - 15/09 | Potatoes |
| D50 | Number of days with Tmin < 0°C | 01/03 - 15/10 | Wheat |
| D51 | Number of days with Tmin < 0°C | 01/01 - 31/12 | Olives |
| D52 | Number of days with Tmin < 0°C | 01/03 - 30/06 | Citrus fruits |
| D53 | Number of days with Tmin < -10°C | 15/11 - 31/12 | Wheat |
| D54 | Number of days with Tmin < -10°C | 01/01 - 28/02 | Wheat |
| D55 | Number of days with Tmin < 10°C | 15/03 - 15/05 | Melons, watermelons |
| D56 | Number of days with Tmin < 10°C | 01/04 - 15/09 | Vegetables |
| D57 | Number of days with Tmin < -10°C | 01/12 - 31/12 | Kiwi |
| D58 | Number of days with Tmin < -10°C | 01/01 - 14/03 | Kiwi |
| D59 | Number of days with Tmin < 15°C | 01/04 - 15/10 | Cotton |
| D60 | Number of days with Tmin < 18°C | 16/05 - 15/09 | Melons, watermelons |
| D61 | Number of days with Tmin < -2°C | 15/02 - 31/05 | Apples, pears, grapes |
| D62 | Number of days with Tmin < -2°C | 15/03 - 30/06 | Kiwi |
| D63 | Number of days with Tmin < -2°C | 01/01 - 31/03 | Vegetables |
| D64 | Number of days with Tmin < -2°C | 16/09 - 31/12 | Vegetables |
| D65 | Number of days with Tmin < -20°C | 01/11 - 31/12 | Grapes |
| D66 | Number of days with Tmin < -20°C | 01/01 - 15/02 | Grapes |
| D67 | Number of days with Tmin < -25°C | 01/01 - 31/01 | Peaches, nectarines, apricots, cherries, plums |
| D68 | Number of days with Tmin < -25°C | 01/11 - 31/12 | Peaches, nectarines, apricots, cherries, plums |
| D69 | Number of days with Tmin < -3°C | 01/02 - 30/06 | Peaches, nectarines, apricots, cherries, plums |
| D70 | Number of days with Tmin < -3°C | 15/02 - 31/05 | Grapes |
| D71 | Number of days with Tmin < -30°C | 01/01 - 14/02 | Apples, pears, grapes |
| D72 | Number of days with Tmin < -30°C | 01/11 - 31/12 | Apples, pears, grapes |
| D73 | Number of days with Tmin < -30°C | 01/11 - 31/12 | Almonds, nuts |
| D74 | Number of days with Tmin < -30°C | 01/01 - 15/01 | Almonds, nuts |
| D75 | Number of days with Tmin < -4°C | 15/01 - 30/06 | Almonds, nuts |
| D76 | Number of days with Tmin < -5°C | 15/10 - 31/12 | Fodder plants |
| D77 | Number of days with Tmin < -5°C | 01/01 - 15/04 | Fodder plants |
| D78 | Number of days with Tmin < -5°C | 01/01 - 31/12 | Legumes |
| D79 | Number of days with Tmin < 7°C | 15/04 - 15/08 | Tobacco |
| D80 | Number of days with Tmin < 8°C | 01/04 - 30/08 | Maize |

**Table S3.** Estimated changes (average of climate simulations) in crop yields due to long-term climate change, compared to those under the historical climate of 1986-2005.

| Crop - Region | 2021-2040 | | |  | 2041-2060 | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| RCP2.6 | RCP4.5 | RCP8.5 |  | RCP2.6 | RCP4.5 | RCP8.5 |
| Chestnuts - Central & Western Macedonia | -4.4% | -6.4% | -6.6% |  | -5.4% | -8.6% | -9.9% |
| Chestnuts - Thessaly | -21.0% | -25.1% | -20.9% |  | -27.9% | -37.8% | -47.4% |
| Chestnuts - Peloponnese & Western Greece | -4.2% | -5.1% | -5.7% |  | -5.4% | -7.4% | -9.6% |
| Chestnuts - Crete | -13.1% | -14.2% | -15.2% |  | -16.4% | -17.6% | -26.0% |
| Walnuts – Eastern Macedonia & Thrace | -15.5% | -18.9% | -24.5% |  | -16.5% | -27.8% | -31.1% |
| Walnuts - Central & Western Macedonia | -16.3% | -22.5% | -21.3% |  | -17.7% | -25.7% | -32.4% |
| Walnuts - Thessaly | -11.6% | -12.7% | -12.8% |  | -13.4% | -17.0% | -22.5% |
| Walnuts - Peloponnese & Western Greece | -11.7% | -12.7% | -16.5% |  | -14.2% | -16.7% | -18.5% |
| Walnuts – Central Greece | -12.2% | -12.5% | -17.3% |  | -22.8% | -22.1% | -19.5% |
| Almonds - Eastern Macedonia & Thrace | -3.4% | -10.3% | -12.9% |  | -2.7% | -8.1% | -16.2% |
| Almonds - Central & Western Macedonia | -4.6% | -6.6% | -6.1% |  | -5.6% | -9.8% | -11.4% |
| Almonds - Thessaly | -4.8% | -6.2% | -5.6% |  | -5.8% | -10.0% | -11.5% |
| Almonds - Central Greece | -5.3% | -6.0% | -5.9% |  | -6.0% | -8.1% | -9.0% |
| Apricots – Central Macedonia | -14.7% | -14.9% | -12.0% |  | -13.1% | -17.3% | -22.2% |
| Apricots - Thessaly | -19.2% | -18.4% | -20.3% |  | -19.2% | -27.7% | -38.7% |
| Apricots - Peloponnese | -17.2% | -19.8% | -24.0% |  | -23.8% | -28.2% | -31.2% |
| Peaches - Central & Western Macedonia | -9.3% | -11.9% | -11.5% |  | -11.9% | -15.7% | -16.9% |
| Peaches - Thessaly | -15.5% | -17.9% | -16.6% |  | -15.1% | -18.6% | -21.0% |
| Cherries - Central & Western Macedonia | -1.0% | -1.9% | -5.1% |  | -5.0% | -3.8% | -5.7% |
| Cherries - Thessaly | -4.8% | -9.4% | -10.1% |  | -9.1% | -13.0% | -15.1% |
| Apples - Central & Western Macedonia | -4.4% | -6.3% | -12.0% |  | -5.2% | -7.2% | -9.0% |
| Apples - Thessaly | -3.4% | -7.3% | -5.6% |  | -7.2% | -9.2% | -12.0% |
| Pears - Central & Western Macedonia | -0.9% | 0.5% | 0.0% |  | 1.2% | 0.6% | 1.6% |
| Pears - Thessaly | -13.5% | -17.1% | -18.8% |  | -15.7% | -19.6% | -28.4% |
| Pears - Peloponnese & Western Greece | -7.5% | -9.1% | -7.1% |  | -5.9% | -9.1% | -12.9% |
| Mandarins - Epirus | -6.8% | -8.9% | -6.4% |  | -7.4% | -10.8% | -13.3% |
| Mandarins - Peloponnese & Western Greece | -5.6% | -3.6% | -5.9% |  | -4.9% | -6.6% | -7.3% |
| Oranges - Epirus | -4.2% | -4.2% | -7.9% |  | -7.4% | -5.8% | -11.3% |
| Oranges - Peloponnese & Western Greece | -2.9% | -5.5% | -6.1% |  | -4.7% | -3.4% | -4.6% |
| Oranges - Crete | -5.6% | -9.5% | -9.8% |  | -10.6% | -11.6% | -12.1% |
| Lemons - Peloponnese & Western Greece | -2.8% | -6.0% | -6.0% |  | -4.4% | -6.4% | -8.4% |
| Lemons - Crete | -3.3% | -9.5% | -8.7% |  | -8.6% | -6.1% | -12.3% |
| Olives - Eastern Macedonia & Thrace | -4.4% | 2.1% | 4.4% |  | -3.9% | 2.0% | -2.1% |
| Olives - Central & Western Macedonia | 5.0% | 2.4% | 1.7% |  | -0.1% | -0.8% | 0.2% |
| Olives - Thessaly | -3.8% | -6.5% | -9.7% |  | -9.0% | -16.5% | -14.4% |
| Olives – Central Greece | -6.0% | -8.5% | -7.4% |  | -9.1% | -12.9% | -12.2% |
| Olives – Ionian Islands | -5.4% | -8.1% | -5.5% |  | -5.7% | -6.6% | -7.7% |
| Olives - Peloponnese & Western Greece | -2.3% | -3.4% | -2.8% |  | -3.3% | -2.7% | -2.5% |
| Olives - Crete | -7.2% | -7.9% | -8.7% |  | -9.6% | -8.2% | -9.8% |
| Melons - Eastern Macedonia & Thrace | 3.5% | 5.1% | 2.3% |  | 0.4% | 0.4% | 0.8% |
| Melons - Central & Western Macedonia | 1.9% | 2.7% | 2.9% |  | 2.4% | 3.9% | 4.4% |
| Melons - Thessaly | 0.0% | -0.7% | -1.5% |  | -0.8% | -0.2% | -1.0% |
| Melons - Central Greece | -0.3% | -0.3% | -0.5% |  | -0.3% | -0.5% | -0.5% |
| Melons - Peloponnese & Western Greece | 0.1% | 0.2% | -2.9% |  | -1.9% | -1.9% | -3.4% |
| Melons - Crete | 0.0% | 0.8% | 0.3% |  | 0.3% | -0.2% | -0.3% |
| Watermelons - Central Macedonia | 4.3% | 5.1% | 5.8% |  | 5.5% | 6.9% | 9.2% |
| Watermelons - Thessaly | -0.1% | 0.5% | -0.3% |  | -0.3% | 0.9% | 0.0% |
| Watermelons - Central Greece | 0.2% | 0.8% | 0.8% |  | 1.7% | 2.1% | 4.2% |
| Watermelons - Peloponnese & Western Greece | -5.0% | -5.3% | -5.8% |  | -4.6% | -6.9% | -9.7% |
| Watermelons - South Aegean | -2.7% | -2.4% | -2.2% |  | -1.5% | -1.6% | -0.2% |
| Lentils - Central & Western Macedonia | 0.9% | 2.1% | 0.7% |  | 0.6% | 2.6% | 3.7% |
| Lentils - Thessaly | -12.3% | -10.9% | -12.2% |  | -14.1% | -12.7% | -19.5% |
| Lentils - Central Greece | -7.4% | -8.7% | -9.2% |  | -7.2% | -7.9% | -10.1% |
| Tobacco - Eastern Macedonia & Thrace | -3.7% | -3.2% | -3.1% |  | -2.3% | -5.2% | -6.8% |
| Tobacco - Central Macedonia | 3.0% | 4.0% | 3.9% |  | 4.3% | 5.3% | 6.7% |
| Tobacco - Thessaly | -3.0% | -3.3% | -3.4% |  | -3.7% | -4.6% | -6.5% |
| Cucumbers - Thessaly | -6.4% | -8.1% | -8.3% |  | -8.9% | -12.0% | -16.1% |
| Cucumbers - Central Greece | -8.8% | -8.9% | -7.6% |  | -5.9% | -8.4% | -6.6% |
| Cucumbers - Peloponnese & Western Greece | -0.5% | -0.9% | -2.8% |  | -3.6% | -2.1% | -3.2% |
| Cucumbers - Crete | -4.5% | -5.1% | -5.8% |  | -5.8% | -7.3% | -8.5% |
| Cucumbers - Attica | -10.6% | -9.1% | -11.3% |  | -10.8% | -12.9% | -18.7% |
| Cucumbers - Ionian Islands | 0.4% | 0.4% | -0.1% |  | -0.5% | 0.2% | 0.9% |
| Cucumbers - South Aegean | -7.1% | -8.0% | -4.9% |  | -4.4% | -7.3% | -7.1% |
| Rye - Eastern Macedonia & Thrace | 4.4% | 4.5% | 6.0% |  | 6.7% | 9.4% | 12.3% |
| Rye - Central Macedonia | -7.4% | -9.0% | -4.8% |  | -6.3% | -8.0% | -8.8% |
| Rye - Western Macedonia | 1.6% | 1.7% | 2.6% |  | 2.2% | 2.4% | 3.6% |
| Rye - Thessaly | -2.2% | -3.0% | -3.3% |  | -2.9% | -5.4% | -6.0% |
| Oat - Central & Western Macedonia | -9.2% | -9.9% | -8.9% |  | -8.7% | -10.6% | -14.5% |
| Oat - Thessaly | -3.9% | -5.4% | -3.1% |  | -2.9% | -1.0% | -2.8% |
| Oat - Central Greece | -0.1% | 0.0% | -0.1% |  | 0.1% | -0.1% | -0.2% |
| Oat - Peloponnese | -0.8% | 0.5% | 0.0% |  | 0.7% | -0.2% | 0.6% |
| Oat - Western Greece | 0.7% | 1.0% | 0.9% |  | 0.9% | 0.8% | 0.6% |
| Oat - Ionian Islands | -1.7% | -1.7% | -3.0% |  | -2.1% | -1.3% | -3.6% |
| Alfalfa - Eastern Macedonia & Thrace | -0.3% | -0.4% | -0.6% |  | -1.1% | -0.3% | 0.3% |
| Alfalfa - Central & Western Macedonia | -1.8% | -3.3% | -3.0% |  | -2.9% | -4.2% | -5.0% |
| Alfalfa - Thessaly | 1.7% | 2.2% | 2.4% |  | 2.3% | 2.7% | 3.1% |
| Alfalfa - Central Greece | 0.2% | 0.1% | 0.1% |  | 0.0% | 0.6% | -0.3% |
| Alfalfa - Western Greece Grc | 0.0% | 4.0% | 1.8% |  | 2.6% | 3.0% | 4.2% |
| Barley - Eastern Macedonia & Thrace | -3.4% | -4.2% | -1.6% |  | -5.0% | -6.2% | -9.2% |
| Barley – Central Macedonia | -3.9% | -7.3% | -1.2% |  | -3.7% | -5.0% | -8.4% |
| Barley – Western Macedonia | -6.7% | -7.0% | -3.7% |  | -6.7% | -7.3% | -8.5% |
| Barley - Thessaly | -6.8% | -9.7% | -5.5% |  | -9.9% | -8.3% | -12.2% |
| Barley – Central Greece | -5.0% | -7.6% | -5.7% |  | -5.6% | -3.9% | -11.0% |
| Cabbage - Eastern Macedonia & Thrace | -1.9% | -1.7% | -2.4% |  | -2.2% | -2.6% | -3.2% |
| Cabbage - Central Macedonia | -1.5% | -1.9% | -1.0% |  | -1.5% | -3.1% | -3.9% |
| Cabbage - Thessaly | -1.0% | -1.8% | -1.1% |  | -1.2% | -4.0% | -5.5% |
| Cabbage - Central Greece | -1.4% | -1.0% | -0.3% |  | -0.9% | -1.6% | -0.4% |
| Cabbage - Western Greece | -2.0% | -1.7% | -2.6% |  | -3.4% | -3.8% | -4.6% |
| Cabbage - Peloponnese | -1.5% | -1.4% | 0.0% |  | -1.9% | -5.1% | -7.2% |
| Cabbage - Crete | 0.7% | 0.4% | -0.1% |  | 0.7% | 0.3% | 0.1% |
| Dry cotton - Eastern Macedonia & Thrace | -4.6% | -3.3% | -3.5% |  | -7.1% | -12.1% | -16.3% |
| Dry cotton - Central Macedonia | -4.3% | -4.4% | -3.5% |  | -6.0% | -15.6% | -19.5% |
| Irrigated cotton - Eastern Macedonia & Thrace | -5.6% | -4.1% | -4.2% |  | -6.6% | -11.8% | -13.9% |
| Irrigated cotton - Central Macedonia | -1.9% | -3.2% | -2.7% |  | -3.6% | -12.9% | -17.0% |
| Irrigated cotton - Thessaly | -5.7% | -6.4% | -6.1% |  | -6.7% | -12.4% | -16.7% |
| Irrigated cotton - Central Greece | -0.2% | -0.1% | -0.8% |  | -0.9% | -7.8% | -9.9% |
| Beans - Eastern Macedonia & Thrace | -2.7% | -2.8% | -4.0% |  | -3.9% | -9.7% | -10.1% |
| Beans - Central Macedonia | -4.9% | -6.0% | -8.4% |  | -9.2% | -15.7% | -17.4% |
| Beans - Western Macedonia | 3.7% | 3.7% | 1.4% |  | 3.2% | 0.9% | 2.4% |
| Beans - Thessaly | -9.4% | -13.3% | -12.3% |  | -15.1% | -22.1% | -24.1% |
| Beans - Central Greece | 2.3% | -6.5% | -8.3% |  | -1.9% | -6.5% | -10.7% |
| Beans - Peloponnese | -4.6% | -7.6% | -7.9% |  | -7.3% | -13.4% | -17.4% |
| Beans - North Aegean | -1.0% | -1.2% | -2.0% |  | -1.3% | -4.2% | -5.4% |
| Maize - Eastern Macedonia & Thrace | -1.3% | -0.2% | -1.7% |  | 0.4% | -3.5% | -4.5% |
| Maize - Central Macedonia | -2.5% | -3.2% | -3.4% |  | -2.6% | -6.6% | -8.3% |
| Maize - Western Macedonia | 3.5% | 4.7% | 3.5% |  | 3.8% | 2.5% | 1.7% |
| Maize - Thessaly | -4.5% | -5.3% | -6.1% |  | -6.4% | -10.8% | -13.7% |
| Maize - Western Greece | -2.3% | -1.2% | -3.1% |  | -3.0% | -6.4% | -8.0% |
| Winter potatoes - Central Macedonia | -6.8% | -6.9% | -8.5% |  | -9.4% | -11.2% | -14.0% |
| Winter potatoes - Western Macedonia | -3.6% | -4.0% | -2.0% |  | -5.8% | -8.0% | -9.9% |
| Winter potatoes - Central Greece | -6.0% | -6.6% | -7.0% |  | -6.0% | -5.3% | -12.9% |
| Winter potatoes - Western Greece | -4.1% | -4.1% | -5.2% |  | -4.2% | -2.7% | -8.6% |
| Winter potatoes - Peloponnese | -6.3% | -2.8% | -5.3% |  | -5.1% | -4.3% | -4.9% |
| Winter potatoes - South Aegean | -1.4% | 0.3% | -0.2% |  | -1.6% | 0.5% | -0.4% |
| Summer potatoes - Eastern Macedonia & Thrace | -8.3% | -8.9% | -8.2% |  | -8.8% | -10.7% | -12.7% |
| Summer potatoes - Central Macedonia | -9.3% | -11.1% | -7.9% |  | -10.9% | -16.8% | -19.4% |
| Summer potatoes - Western Macedonia | -5.6% | -8.3% | -5.0% |  | -7.5% | -12.5% | -15.8% |
| Summer potatoes - Epirus | -4.0% | -6.7% | -2.8% |  | -4.8% | -8.5% | -8.4% |
| Summer potatoes - Central Greece | -13.9% | -15.9% | -16.7% |  | -14.8% | -19.4% | -24.2% |
| Summer potatoes - Western Greece | -11.6% | -12.2% | -7.9% |  | -10.3% | -14.8% | -18.4% |
| Summer potatoes - Peloponnese | -9.2% | -6.9% | -8.7% |  | -9.9% | -13.5% | -14.3% |
| Summer potatoes - Crete | -7.0% | -5.8% | -6.0% |  | -7.1% | -7.9% | -12.5% |
| Summer potatoes - South Aegean | -8.0% | -7.1% | -7.4% |  | -6.4% | -9.1% | -10.9% |
| Rice - Eastern Macedonia & Thrace | -4.3% | -1.8% | -3.0% |  | -3.7% | -9.3% | -12.5% |
| Rice - Central Macedonia | -7.0% | -5.7% | -5.9% |  | -6.3% | -11.7% | -15.1% |
| Sunflower - Eastern Macedonia & Thrace | 1.8% | 1.4% | 1.2% |  | 2.1% | 2.0% | 2.7% |
| Sunflower - Central Macedonia | 1.2% | 0.4% | 0.8% |  | 0.6% | 0.9% | 1.9% |
| Sunflower - Western Macedonia | 6.8% | 7.3% | 5.5% |  | 7.0% | 8.7% | 9.9% |
| Tomatoes - Eastern Macedonia & Thrace | -3.5% | -4.4% | -6.4% |  | -5.3% | -8.6% | -11.5% |
| Tomatoes - Central Macedonia | -4.3% | -7.8% | -7.6% |  | -7.2% | -12.1% | -15.3% |
| Tomatoes - Thessaly | -5.6% | -8.6% | -8.9% |  | -8.7% | -16.0% | -18.1% |
| Tomatoes - Western Greece | -4.5% | -6.4% | -5.6% |  | -6.1% | -10.1% | -12.9% |
| Tomatoes - Central Greece | -5.3% | -7.3% | -7.7% |  | -6.9% | -12.3% | -16.5% |
| Tomatoes - Peloponnese | -5.8% | -6.8% | -5.9% |  | -9.0% | -13.8% | -17.3% |
| Tomatoes - Crete | -1.1% | -2.8% | -4.1% |  | -6.2% | -5.0% | -9.2% |
| Tomatoes - South Aegean | -2.1% | -4.1% | -3.7% |  | -6.7% | -6.4% | -10.5% |
| Wheat - Eastern Macedonia & Thrace | -2.4% | -0.8% | -3.5% |  | -5.2% | -3.5% | -6.7% |
| Wheat - Central Macedonia | -5.9% | -6.0% | -6.4% |  | -6.7% | -2.2% | -8.9% |
| Wheat - Western Macedonia | -3.6% | -2.7% | -3.2% |  | -2.6% | -2.0% | -5.5% |
| Wheat - Thessaly | -5.6% | -5.9% | -6.2% |  | -7.2% | -4.8% | -8.1% |
| Wheat - Central Greece | -0.6% | -7.0% | -5.7% |  | -4.7% | -0.7% | -6.2% |
| Vines - Eastern Macedonia & Thrace | -0.2% | 0.1% | 0.0% |  | 1.7% | 1.0% | -1.9% |
| Vines - Central Macedonia | -1.3% | -1.3% | -2.4% |  | 0.2% | -1.7% | -4.0% |
| Vines - Western Macedonia | -14.9% | -16.1% | -9.3% |  | -8.2% | -14.3% | -14.7% |
| Vines - Thessaly | -4.9% | -5.4% | -5.9% |  | -2.5% | -5.9% | -6.6% |
| Vines - Epirus | -2.5% | -1.9% | -0.9% |  | -1.2% | -0.8% | -1.7% |
| Vines - Ionian Islands | -2.5% | -1.1% | -5.5% |  | -1.4% | -4.7% | -6.8% |
| Vines - Central Greece | -2.2% | -1.5% | -5.5% |  | -0.9% | -5.6% | -6.3% |
| Vines - Attica | -2.7% | -3.7% | -6.0% |  | -3.7% | -3.6% | -6.8% |
| Vines - Peloponnese | -8.4% | -7.4% | -9.5% |  | -5.0% | -6.7% | -9.9% |
| Vines - Western Greece | -4.3% | -1.9% | -3.1% |  | -3.8% | -3.7% | -5.3% |
| Vines - North Aegean | -5.0% | -3.3% | -6.8% |  | -2.3% | -3.0% | -6.6% |
| Vines - South Aegean | -8.9% | -9.7% | -11.5% |  | -5.8% | -3.1% | -9.8% |
| Vines - Crete | -8.9% | -9.4% | -11.1% |  | -5.5% | -3.2% | -9.5% |

**Table S4.** Direct economic effects (in €/year) on the Greek crop farming due to long-term climate change – Average estimate per region1.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Region | 2021-2040 | | | 2041-2060 | | | |
| RCP2.6 | RCP4.5 | RCP8.5 | RCP2.6 | RCP4.5 | RCP8.5 | *of which losses from olive trees:* |
| Eastern Macedonia & Thrace | -17,027,011 | -13,599,916 | -15,999,518 | -17,465,553 | -27,792,380 | -38,009,949 | *2.0%* |
| Central Macedonia | -43,805,274 | -58,826,105 | -63,061,682 | -62,183,347 | -93,424,058 | -118,247,561 | *-* |
| Western Macedonia | -12,500,365 | -16,860,710 | -21,268,855 | -15,029,840 | -21,806,383 | -27,339,541 | *-* |
| Epirus | -3,565,392 | -4,451,428 | -4,094,409 | -4,466,150 | -5,531,552 | -7,599,990 | *-* |
| Thessaly | -64,467,126 | -82,042,215 | -83,519,345 | -85,306,546 | -127,088,801 | -156,798,571 | *9.5%* |
| Central Greece | -23,420,949 | -33,632,621 | -33,585,899 | -35,855,521 | -50,858,000 | -56,466,969 | *48.9%* |
| Ionian Islands | -4,006,867 | -5,804,205 | -4,380,656 | -4,164,195 | -5,040,779 | -6,048,233 | *89.7%* |
| Western Greece | -23,206,628 | -26,183,302 | -26,592,615 | -26,972,164 | -31,528,407 | -37,996,258 | *21.7%* |
| Peloponnese | -35,987,980 | -47,150,504 | -47,996,179 | -45,977,989 | -46,664,074 | -52,580,087 | *28.0%* |
| Attica | -734,225 | -955,195 | -1,516,307 | -959,667 | -967,502 | -1,774,026 | *-* |
| North Aegean | -381,094 | -281,734 | -554,859 | -221,161 | -430,138 | -736,259 | *-* |
| South Aegean | -1,524,286 | -1,555,155 | -1,655,113 | -1,431,419 | -1,431,731 | -2,187,257 | *-* |
| Crete | -30,925,302 | -34,416,122 | -38,562,601 | -37,706,131 | -32,039,671 | -43,089,118 | *67.2%* |
|  |  |  |  |  |  |  |  |
| Greece TOTAL | -261,552,500 | -325,759,211 | -342,788,038 | -337,739,682 | -444,603,477 | -548,873,819 | *18.3%* |

1 Effects with a negative (-) sign: economic losses, effects with a positive (+) sign: economic benefits.

**Table S5.** Direct economic effects (in €/year) on the Greek crop farming due to long-term climate change – Average estimate per crop1.

| Crop | 2021-2040 | | | | 2041-2060 | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RCP2.6 | RCP4.5 | RCP8.5 | RCP2.6 | | RCP4.5 | RCP8.5 |
| Chestnuts | -8,037,724 | -9,854,672 | -8,794,132 | -10,538,071 | | -14,439,273 | -18,056,204 |
| Walnuts | -18,527,201 | -21,831,105 | -24,470,863 | -23,240,510 | | -29,264,522 | -33,999,685 |
| Almonds | -6,431,128 | -9,242,963 | -8,980,114 | -7,507,643 | | -13,311,576 | -16,302,959 |
| Apricots | -10,573,837 | -11,252,670 | -11,702,134 | -11,846,801 | | -15,035,802 | -18,305,340 |
| Peaches | -23,726,829 | -29,699,755 | -28,615,350 | -29,023,888 | | -37,939,984 | -40,982,376 |
| Cherries | -2,303,617 | -4,358,641 | -9,315,782 | -9,066,616 | | -7,777,863 | -10,967,942 |
| Apples | -6,674,139 | -10,454,574 | -16,659,751 | -9,109,003 | | -12,294,362 | -15,613,911 |
| Pears | -10,028,104 | -12,074,221 | -13,124,918 | -10,551,691 | | -13,663,087 | -19,597,040 |
| Mandarins | -4,536,630 | -4,482,412 | -4,490,119 | -4,455,357 | | -6,316,221 | -7,462,191 |
| Oranges | -7,915,840 | -14,107,554 | -16,177,908 | -13,385,539 | | -10,737,425 | -14,419,898 |
| Lemons | -1,038,361 | -2,330,727 | -2,296,931 | -1,782,356 | | -2,276,940 | -3,224,247 |
| Table olives | -11,925,772 | -18,350,492 | -16,842,207 | -24,254,520 | | -31,242,160 | -29,686,322 |
| Olives for oil | -49,406,932 | -65,868,330 | -62,122,182 | -69,718,396 | | -68,592,475 | -70,729,931 |
| Melons | 170,609 | 226,240 | -229,866 | -145,831 | | -59,663 | -238,059 |
| Watermelons | -1,776,421 | -1,761,514 | -1,922,455 | -1,397,884 | | -2,128,591 | -2,914,994 |
| Lentils | -982,978 | -800,307 | -1,031,332 | -1,146,493 | | -869,282 | -1,316,791 |
| Tobacco | -1,205,714 | -790,125 | -778,019 | -393,066 | | -1,445,071 | -2,088,602 |
| Cucumbers | -449,616 | -485,982 | -550,156 | -551,378 | | -647,097 | -781,087 |
| Rye | 1,023 | -7,081 | 35,789 | 22,024 | | 19,918 | 44,442 |
| Oat | -291,749 | -302,838 | -234,715 | -202,627 | | -209,704 | -359,389 |
| Soft wheat | -2,817,437 | -2,662,742 | -3,202,218 | -3,502,617 | | -1,770,423 | -4,750,860 |
| Durum wheat | -8,457,963 | -10,251,166 | -10,893,601 | -11,640,822 | | -5,786,146 | -14,807,898 |
| Barley | -3,367,520 | -4,866,998 | -2,288,189 | -4,167,865 | | -4,014,019 | -6,271,604 |
| Maize | -6,331,081 | -6,084,048 | -8,720,736 | -6,684,412 | | -17,351,706 | -22,239,379 |
| Rice | -3,555,460 | -2,833,571 | -2,934,516 | -3,196,732 | | -5,971,272 | -7,749,772 |
| Cabbage | -262,893 | -282,309 | -197,482 | -292,947 | | -579,891 | -706,109 |
| Industrial tomatoes | -11,300,001 | -16,929,191 | -16,905,564 | -16,649,141 | | -29,740,524 | -35,554,787 |
| Table tomatoes | -3,998,203 | -5,676,514 | -5,617,428 | -6,536,950 | | -10,046,922 | -13,141,004 |
| Green beans | -1,803,054 | -3,157,581 | -3,921,132 | -3,648,980 | | -6,728,140 | -7,769,136 |
| Dry beans | -182,324 | -711,538 | -1,328,322 | -919,402 | | -2,707,684 | -2,880,229 |
| Irrigated cotton | -15,855,959 | -17,596,343 | -16,970,136 | -20,932,142 | | -49,844,729 | -64,868,897 |
| Dry cotton | -1,092,868 | -827,187 | -847,755 | -1,668,891 | | -3,032,852 | -4,041,797 |
| Sunflower | 1,661,334 | 1,273,934 | 1,192,569 | 1,695,228 | | 1,789,122 | 2,481,858 |
| Potatoes | -17,602,166 | -18,491,423 | -16,757,593 | -18,517,959 | | -24,098,824 | -30,821,140 |
| Grapes for wine | -10,506,652 | -9,815,514 | -13,220,930 | -6,364,834 | | -9,195,442 | -14,896,058 |
| Table grapes | -3,522,048 | -3,455,650 | -4,277,808 | -1,117,443 | | -2,007,120 | -5,342,351 |
| Corinth raisins | -2,282,086 | -1,546,195 | -2,264,004 | -1,633,157 | | -1,956,887 | -2,867,241 |
| Sultana raisin | -2,502,170 | -2,615,113 | -3,118,541 | -1,530,950 | | -935,829 | -2,686,347 |
| Fodder plants - Alfalfa | -1,330,615 | -430,294 | -1,672,365 | -1,362,977 | | -1,659,470 | -1,648,096 |
| Fodder plants - Oat | -288,460 | -259,723 | -175,293 | -128,880 | | -141,067 | -368,908 |
| Fodder plants - Barley | -493,911 | -710,322 | -363,850 | -642,162 | | -592,472 | -941,535 |
| Greece TOTAL | -261,552,500 | -325,759,211 | -342,788,038 | -337,739,682 | | -444,603,477 | -548,873,819 |

1 Effects with a negative (-) sign: economic losses, effects with a positive (+) sign: economic benefits.

**Table S6.** Direct economic effects (in €/year) on the Greek livestock due to long-term climate change – Average estimate per region1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Region | 2021-2040 | | | 2041-2060 | | |
| RCP2.6 | RCP4.5 | RCP8.5 | RCP2.6 | RCP4.5 | RCP8.5 |
| Eastern Macedonia & Thrace | -21,377,477 | -26,924,033 | -35,194,628 | -31,361,622 | -32,742,708 | -44,341,551 |
| Central Macedonia | -37,646,937 | -56,156,320 | -70,202,351 | -53,800,179 | -69,560,538 | -90,261,081 |
| Western Macedonia | -3,693,635 | -5,546,058 | -7,643,531 | -5,659,580 | -7,058,849 | -9,265,018 |
| Epirus | -8,241,701 | -12,677,549 | -16,588,015 | -13,049,194 | -16,652,329 | -20,681,334 |
| Thessaly | -48,368,820 | -68,194,035 | -91,384,995 | -70,792,840 | -96,221,004 | -115,709,204 |
| Central Greece | -9,606,845 | -12,307,665 | -16,526,857 | -15,954,162 | -19,513,058 | -24,169,042 |
| Ionian Islands | -1,566,553 | -2,411,173 | -3,080,058 | -2,669,533 | -3,544,401 | -4,102,172 |
| Western Greece | -7,384,052 | -13,485,966 | -19,099,169 | -18,872,207 | -25,029,111 | -31,726,694 |
| Peloponnese | -1,587,391 | -2,280,741 | -3,341,616 | -2,541,895 | -3,478,476 | -4,476,404 |
| Attica | -1,614,111 | -3,002,913 | -4,631,300 | -6,976,355 | -7,297,259 | -8,755,740 |
| North Aegean | -4,227,462 | -5,350,235 | -7,214,268 | -7,898,032 | -8,825,877 | -10,671,475 |
| South Aegean | -3,990,934 | -4,481,380 | -7,113,070 | -8,876,034 | -8,825,301 | -12,473,012 |
| Crete | -1,363,142 | -3,126,525 | -8,038,985 | -12,421,655 | -12,528,674 | -20,161,211 |
| Greece TOTAL | -150,669,059 | -215,944,594 | -290,058,841 | -250,873,287 | -311,277,585 | -396,793,939 |

1 Effects with a negative (-) sign: economic losses, effects with a positive (+) sign: economic benefits.

**Table S7.** Direct economic effects (in €/year) on the Greek livestock due to long-term climate change – Average estimate per livestock product1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Livestock product | 2021-2040 | | | 2041-2060 | | |
| RCP2.6 | RCP4.5 | RCP8.5 | RCP2.6 | RCP4.5 | RCP8.5 |
| Milk from cows | -100,599,218 | -141,009,897 | -183,464,062 | -150,458,851 | -191,470,586 | -239,310,834 |
| Milk from sheep | -3,742,445 | -13,209,830 | -25,521,374 | -31,026,891 | -36,635,781 | -53,248,074 |
| Milk from goats | -2,150,987 | -2,585,881 | -4,370,864 | -3,655,638 | -2,738,732 | -4,444,873 |
| Eggs | -724,839 | -1,203,185 | -1,883,833 | -2,178,203 | -2,504,500 | -3,168,811 |
| Meat from cattle | -20,976,217 | -27,339,041 | -34,004,916 | -28,080,469 | -34,359,791 | -42,152,965 |
| Meat from pigs | -17,645,791 | -22,954,165 | -28,962,364 | -24,348,563 | -29,942,518 | -36,731,405 |
| Meat from chicken | -4,829,562 | -7,642,596 | -11,851,427 | -11,124,671 | -13,625,677 | -17,736,976 |
| Greece TOTAL | -150,669,059 | -215,944,594 | -290,058,841 | -250,873,287 | -311,277,585 | -396,793,939 |

1 Effects with a negative (-) sign: economic losses, effects with a positive (+) sign: economic benefits.

**Table S8.** Direct economic effects (in €/year) on the Greek agriculture due to extreme weather and climate events – Average estimate per crop1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Crop | 2021-2040 | 2021-2040 | 2021-2040 | 2041-2060 | 2041-2060 | 2041-2060 |
| RCP26 | RCP45 | RCP85 | RCP26 | RCP45 | RCP85 |
| Citrus fruits | +1,324,590 | +3,177,752 | +2,844,372 | +4,667,362 | +2,910,447 | +4,145,468 |
| Vegetables | -1,073,522 | -1,749,256 | -3,995,507 | +477,422 | -7,428,679 | -24,993,677 |
| Peaches | +143,852 | +9,949,495 | +13,686,042 | +8,769,567 | +9,759,465 | +14,861,050 |
| Tobacco | -557,398 | +1,867,279 | -3,204,911 | -330,966 | -547,428 | -1,561,117 |
| Olives | -1,070,078 | -36,209 | +415,559 | +1,675,065 | -196,632 | +330,654 |
| Cotton | -951,221 | -2,115,336 | -4,704,929 | +2,884,706 | -2,103,102 | -7,852,863 |
| Cereals & fodder | +371,876 | -1,260,377 | -1,264,455 | +1,393,082 | -454,965 | -1,879,008 |
| Apples | -663,234 | -2,304,786 | -612,412 | +81,159 | -2,999,817 | -1,198,830 |
| Cherries | -3,156,535 | +494,104 | +2,115,902 | +719,316 | -2,555,022 | +490,045 |
| Vines | -11,977,969 | -10,566,910 | -11,446,889 | -10,100,272 | -27,313,155 | -33,626,362 |
| Potatoes | -422,620 | -221,408 | -397,808 | +295,226 | -752,587 | -157,825 |
| Rest fruit | -258,630 | +302,403 | +307,490 | +538,328 | -281,240 | -36,076 |
| Pears | -135,227 | +289,330 | +400,801 | +52,293 | -276,216 | -32,851 |
| Tomatoes | -4,116,419 | -4,340,702 | -3,509,574 | -2,229,072 | -8,607,984 | -13,201,980 |
| Almonds & Walnuts | +716,068 | +2,290,209 | +2,471,210 | +2,163,845 | +2,245,989 | +3,797,684 |
| Rest crops | -117,393 | -11,977 | -85,694 | +157,768 | -115,161 | -181,569 |
| Melons & Watermelons | -1,808,146 | -1,451,059 | -910,255 | -900,454 | -4,123,864 | -4,533,024 |
| Kiwi | +23,879 | +816,725 | +318,447 | +609,409 | +576,952 | +71,200 |
| Maize | -190,090 | -32,850 | -345,060 | -143,719 | -532,403 | -791,286 |
| Legumes | -48,128 | -142,196 | -207,411 | +294,128 | +15,712 | -527,750 |
| Industrial aromatic plants | +149,861 | -666,161 | -396,363 | +748,459 | -198,363 | -618,102 |
| *Forest fires*2 | *-1,344,196* | *-1,261,005* | *-1,642,598* | *-1,721,690* | *-2,366,962* | *-1,642,598* |
| GREECE Total | -25,160,680 | -6,972,936 | -10,164,042 | +10,100,962 | -45,345,017 | -69,138,818 |

1 Effects with a negative (-) sign: economic losses, effects with a positive (+) sign: economic benefits.

2 Damages from forest fires are estimate at the regional level but not at crop level as in the historic ELGA damage records.

**Table S9.** Direct economic effects (in €/year) on the Greek agriculture due to extreme weather and climate events – Average estimate per region1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Region | 2021-2040 | 2021-2040 | 2021-2040 | 2041-2060 | 2041-2060 | 2041-2060 |
| RCP26 | RCP45 | RCP85 | RCP26 | RCP45 | RCP85 |
| Eastern Macedonia & Thrace | -2,054,321 | -1,751,224 | -4,528,702 | +38,232 | -5,248,868 | -9,995,789 |
| Central Macedonia | -5,505,806 | +5,307,629 | +6,561,695 | +8,191,481 | -3,063,503 | -5,420,649 |
| Western Macedonia | -1,071,610 | -1,317,782 | -594,813 | +512,612 | -2,624,117 | -1,834,833 |
| Epirus | +29,503 | +403,852 | +310,205 | +648,262 | +96,868 | +235,244 |
| Thessaly | -4,217,321 | -1,989,103 | -3,018,412 | +1,792,213 | -7,900,899 | -12,549,230 |
| Central Greece | -2,294,253 | -2,133,902 | -2,852,611 | -336,044 | -5,491,507 | -9,585,982 |
| Ionian Islands | -125,091 | -76,840 | -75,157 | +9,384 | -193,067 | -252,210 |
| Western Greece | -3,496,836 | -2,529,905 | -2,578,292 | -755,143 | -7,739,400 | -11,194,114 |
| Peloponnese | -2,339,481 | +471,829 | +363,969 | +2,363,691 | -3,950,774 | -5,791,182 |
| Attica | -1,152,227 | -1,022,050 | -1,124,462 | -966,259 | -2,653,418 | -3,361,915 |
| North Aegean | -17,121 | -22,163 | -30,653 | +3,243 | -23,021 | -52,557 |
| South Aegean | -193,117 | -179,968 | -148,938 | -110,740 | -431,259 | -584,924 |
| Crete | -2,722,999 | -2,133,309 | -2,447,871 | -1,289,969 | -6,122,054 | -8,750,677 |
| GREECE Total | -25,160,680 | -6,972,936 | -10,164,042 | +10,100,962 | -45,345,017 | -69,138,818 |

1 Effects with a negative (-) sign: economic losses, effects with a positive (+) sign: economic benefits.

**Εικόνα που περιέχει κείμενο, ορθογώνιο παραλληλόγραμμο, διάγραμμα, παράλληλα

Περιγραφή που δημιουργήθηκε αυτόματα**

**Figure S1(a).** Estimated values of selected indicators for heatwaves, frost, and windstorm events under the historical climate reference period and the future periods.

**Εικόνα που περιέχει κείμενο, ορθογώνιο παραλληλόγραμμο, παράλληλα, στιγμιότυπο οθόνης

Περιγραφή που δημιουργήθηκε αυτόματα**

**Figure S1(b).** Estimated values of selected indicators for extreme rainfall and fire events under the historical climate reference period and the future periods.

Εικόνα που περιέχει κείμενο, στιγμιότυπο οθόνης, γραμματοσειρά, διάγραμμα

Περιγραφή που δημιουργήθηκε αυτόματα

**Figure S2**. Changes (% with respect to 2018) in regional output and employment which are generated by direct economic effects of (i.e., by changes of the gross production value due to) climate change under RCP2.6, without extreme events.

Εικόνα που περιέχει κείμενο, στιγμιότυπο οθόνης, γραμματοσειρά, διάγραμμα

Περιγραφή που δημιουργήθηκε αυτόματα

**Figure S3**. Changes (% with respect to 2018) in regional output and employment which are generated by direct economic effects of (i.e., by changes of the gross production value due to) climate change under RCP4.5, without extreme events.