

# Long-Term Climatic Changes in Small Ruminant Farms in Greece and Potential Associations with Animal Health

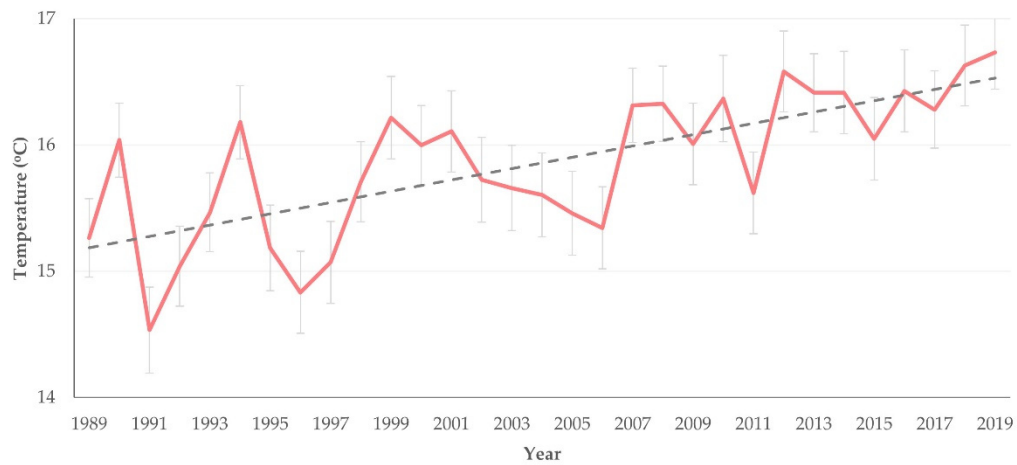
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**Table S1.** Annual average ( $\pm$  standard error of the mean) values of climatic parameters among locations of 444 small ruminant farms throughout Greece from 1989 to 2019.

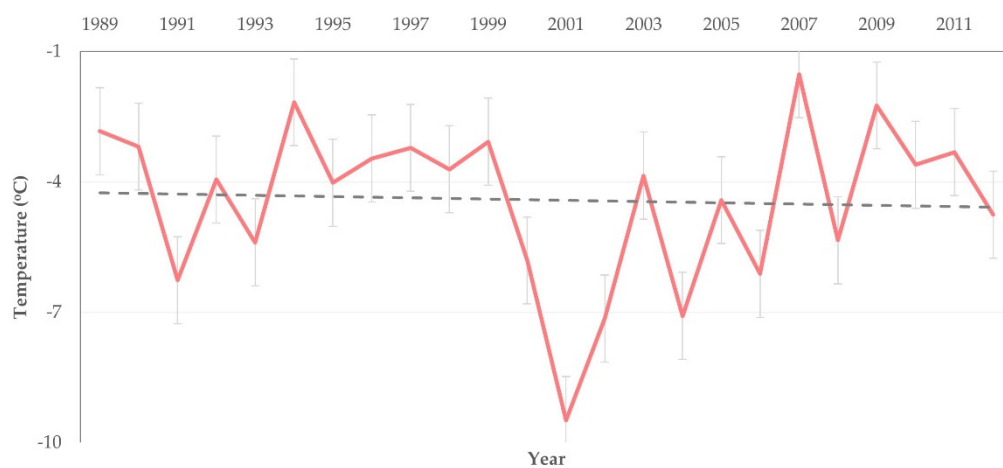
Year	Temperature at 2 m ( $^{\circ}$ C)	Temperature of earth skin ( $^{\circ}$ C)	Minimum temperature at 2 m ( $^{\circ}$ C)	Maximum temperature at 2 m ( $^{\circ}$ C)	Temperature range at 2 m ( $^{\circ}$ C)	Relative humidity (%)	Precipitation (mm)	Wind speed at 10 m ( $\text{m s}^{-1}$ )
1989	14.75 $\pm$ 0.27	15.26 $\pm$ 0.31	-2.84 $\pm$ 0.61	34.67 $\pm$ 0.30	37.50 $\pm$ 0.79	66.5 $\pm$ 0.4	0.96 $\pm$ 0.02	2.49 $\pm$ 0.11
1990	15.51 $\pm$ 0.26	16.04 $\pm$ 0.29	-3.19 $\pm$ 0.70	35.62 $\pm$ 0.32	38.81 $\pm$ 0.89	64.4 $\pm$ 0.4	1.25 $\pm$ 0.04	2.43 $\pm$ 0.12
1991	14.03 $\pm$ 0.29	14.54 $\pm$ 0.34	-6.26 $\pm$ 0.79	34.95 $\pm$ 0.29	41.22 $\pm$ 0.94	70.5 $\pm$ 0.3	1.47 $\pm$ 0.03	2.49 $\pm$ 0.12
1992	14.55 $\pm$ 0.27	15.04 $\pm$ 0.32	-3.95 $\pm$ 0.61	35.67 $\pm$ 0.31	39.62 $\pm$ 0.78	66.1 $\pm$ 0.4	1.15 $\pm$ 0.02	2.58 $\pm$ 0.12
1993	14.93 $\pm$ 0.27	15.47 $\pm$ 0.31	-5.39 $\pm$ 0.81	37.88 $\pm$ 0.35	43.27 $\pm$ 1.03	64.8 $\pm$ 0.5	1.21 $\pm$ 0.04	2.57 $\pm$ 0.12
1994	15.77 $\pm$ 0.26	16.18 $\pm$ 0.29	-2.17 $\pm$ 0.62	38.89 $\pm$ 0.38	41.06 $\pm$ 0.87	67.3 $\pm$ 0.4	1.71 $\pm$ 0.04	2.52 $\pm$ 0.13
1995	14.62 $\pm$ 0.29	15.18 $\pm$ 0.34	-4.02 $\pm$ 0.85	34.76 $\pm$ 0.29	38.78 $\pm$ 0.96	69.5 $\pm$ 0.3	1.50 $\pm$ 0.05	2.52 $\pm$ 0.12
1996	14.29 $\pm$ 0.29	14.83 $\pm$ 0.32	-3.46 $\pm$ 0.64	37.21 $\pm$ 0.41	40.67 $\pm$ 0.94	71.3 $\pm$ 0.3	1.71 $\pm$ 0.05	2.50 $\pm$ 0.12
1997	14.48 $\pm$ 0.28	15.07 $\pm$ 0.32	-3.22 $\pm$ 0.65	38.06 $\pm$ 0.37	41.27 $\pm$ 0.92	68.0 $\pm$ 0.4	1.45 $\pm$ 0.03	2.59 $\pm$ 0.12
1998	15.20 $\pm$ 0.28	15.71 $\pm$ 0.32	-3.71 $\pm$ 0.66	39.47 $\pm$ 0.43	43.18 $\pm$ 0.96	68.3 $\pm$ 0.3	1.58 $\pm$ 0.03	2.56 $\pm$ 0.11
1999	15.73 $\pm$ 0.28	16.21 $\pm$ 0.33	-3.08 $\pm$ 0.69	38.99 $\pm$ 0.38	42.07 $\pm$ 0.98	69.5 $\pm$ 0.3	1.64 $\pm$ 0.04	2.46 $\pm$ 0.11
2000	15.44 $\pm$ 0.26	16.00 $\pm$ 0.31	-5.81 $\pm$ 0.83	40.60 $\pm$ 0.45	46.41 $\pm$ 1.12	65.7 $\pm$ 0.4	1.01 $\pm$ 0.03	2.49 $\pm$ 0.12
2001	15.52 $\pm$ 0.28	16.11 $\pm$ 0.32	-9.48 $\pm$ 1.14	37.21 $\pm$ 0.34	46.69 $\pm$ 1.36	67.2 $\pm$ 0.4	1.45 $\pm$ 0.04	2.68 $\pm$ 0.12
2002	15.28 $\pm$ 0.29	15.72 $\pm$ 0.33	-7.15 $\pm$ 0.82	37.31 $\pm$ 0.29	44.46 $\pm$ 0.98	71.2 $\pm$ 0.3	2.01 $\pm$ 0.04	2.39 $\pm$ 0.11
2003	15.10 $\pm$ 0.29	15.66 $\pm$ 0.34	-3.86 $\pm$ 0.65	38.24 $\pm$ 0.36	42.10 $\pm$ 0.85	70.1 $\pm$ 0.3	1.82 $\pm$ 0.04	2.59 $\pm$ 0.13
2004	15.08 $\pm$ 0.29	15.60 $\pm$ 0.33	-7.08 $\pm$ 0.65	36.79 $\pm$ 0.35	43.87 $\pm$ 0.88	69.9 $\pm$ 0.3	1.61 $\pm$ 0.05	2.55 $\pm$ 0.12
2005	14.88 $\pm$ 0.28	15.46 $\pm$ 0.33	-4.42 $\pm$ 0.73	37.16 $\pm$ 0.34	41.58 $\pm$ 0.95	70.0 $\pm$ 0.3	1.81 $\pm$ 0.06	2.51 $\pm$ 0.12
2006	14.90 $\pm$ 0.27	15.34 $\pm$ 0.32	-6.12 $\pm$ 0.78	38.58 $\pm$ 0.39	44.70 $\pm$ 1.07	70.2 $\pm$ 0.3	1.59 $\pm$ 0.04	2.48 $\pm$ 0.12
2007	15.89 $\pm$ 0.26	16.31 $\pm$ 0.29	-1.53 $\pm$ 0.63	41.12 $\pm$ 0.41	42.64 $\pm$ 0.92	66.9 $\pm$ 0.3	1.49 $\pm$ 0.03	2.45 $\pm$ 0.11
2008	15.81 $\pm$ 0.26	16.32 $\pm$ 0.30	-5.34 $\pm$ 0.61	37.67 $\pm$ 0.38	43.02 $\pm$ 0.86	67.9 $\pm$ 0.3	1.31 $\pm$ 0.04	2.49 $\pm$ 0.11
2009	15.60 $\pm$ 0.28	16.02 $\pm$ 0.32	-2.24 $\pm$ 0.62	39.19 $\pm$ 0.45	41.43 $\pm$ 0.96	70.5 $\pm$ 0.3	1.97 $\pm$ 0.06	2.46 $\pm$ 0.12

2010	$15.91 \pm 0.30$	$16.37 \pm 0.34$	$-3.61 \pm 0.67$	$37.31 \pm 0.32$	$40.92 \pm 0.87$	$70.6 \pm 0.3$	$1.85 \pm 0.05$	$2.49 \pm 0.12$
2011	$15.05 \pm 0.27$	$15.62 \pm 0.32$	$-3.31 \pm 0.59$	$37.38 \pm 0.37$	$40.69 \pm 0.86$	$68.2 \pm 0.3$	$1.39 \pm 0.04$	$2.53 \pm 0.12$
2012	$16.05 \pm 0.27$	$16.58 \pm 0.32$	$-4.76 \pm 0.71$	$39.84 \pm 0.44$	$44.60 \pm 1.00$	$66.6 \pm 0.4$	$1.68 \pm 0.04$	$2.60 \pm 0.12$
2013	$15.97 \pm 0.26$	$16.41 \pm 0.31$	$-2.68 \pm 0.58$	$36.41 \pm 0.36$	$39.10 \pm 0.87$	$68.1 \pm 0.3$	$1.50 \pm 0.04$	$2.53 \pm 0.13$
2014	$15.89 \pm 0.28$	$16.41 \pm 0.33$	$-1.66 \pm 0.75$	$36.59 \pm 0.31$	$38.25 \pm 0.87$	$71.5 \pm 0.3$	$1.91 \pm 0.06$	$2.36 \pm 0.11$
2015	$15.64 \pm 0.27$	$16.05 \pm 0.33$	$-4.96 \pm 0.72$	$37.46 \pm 0.31$	$42.43 \pm 0.93$	$70.3 \pm 0.3$	$1.74 \pm 0.04$	$2.49 \pm 0.12$
2016	$15.93 \pm 0.27$	$16.43 \pm 0.32$	$-3.50 \pm 0.65$	$37.45 \pm 0.37$	$40.95 \pm 0.86$	$68.2 \pm 0.3$	$1.56 \pm 0.06$	$2.51 \pm 0.12$
2017	$15.75 \pm 0.26$	$16.28 \pm 0.31$	$-6.88 \pm 0.84$	$39.73 \pm 0.41$	$46.61 \pm 1.09$	$66.4 \pm 0.3$	$1.55 \pm 0.04$	$2.46 \pm 0.11$
2018	$16.21 \pm 0.27$	$16.63 \pm 0.32$	$-2.14 \pm 0.67$	$35.64 \pm 0.34$	$37.78 \pm 0.82$	$69.9 \pm 0.3$	$1.78 \pm 0.05$	$2.49 \pm 0.11$
2019	$16.23 \pm 0.25$	$16.73 \pm 0.29$	$-4.60 \pm 0.76$	$37.23 \pm 0.32$	$41.83 \pm 0.98$	$68.4 \pm 0.3$	$0.96 \pm 0.02$	$2.43 \pm 0.12$

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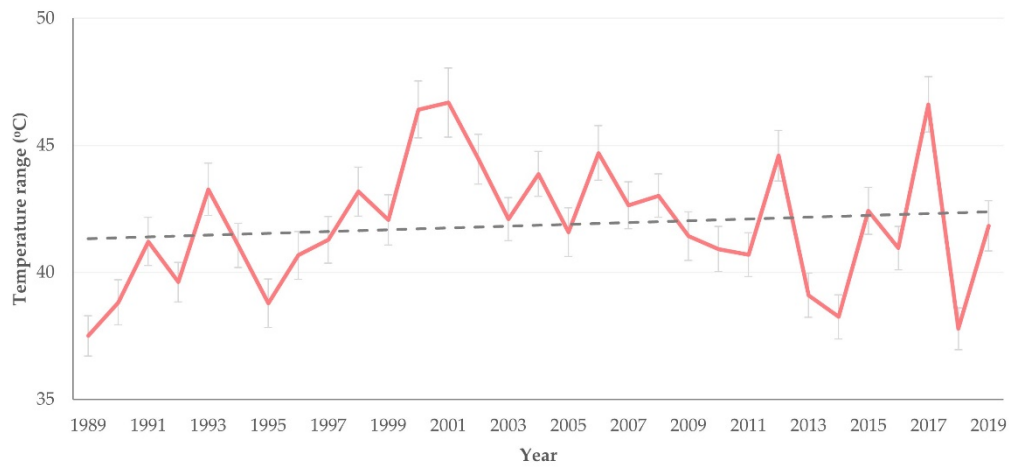
**Figure S1.** Annual average temperature of Earth skin from 1989 to 2019 among locations of 444 small ruminant farms throughout Greece (dashed line is the respective trendline; slope: 0.044,  $p < 0.0001$ ).



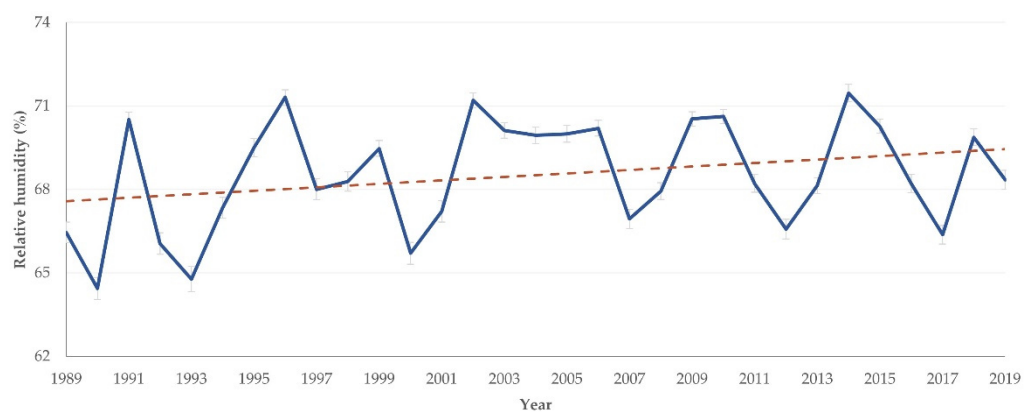
**Figure S2.** Annual average annual minimum temperature at 2 m from 1989 to 2019 among locations of 444 small ruminant farms throughout Greece (dashed line is the respective trendline; slope: 0.011,  $p = 0.77$ ).



**Figure S3.** Annual average annual maximum temperature at 2 m from 1989 to 2019 among locations of 444 small ruminant farms throughout Greece (dashed line is the respective trendline; slope: 0.046,  $p = 0.17$ ).



**Figure S4.** Annual average range of temperature at 2 m from 1989 to 2019 among locations of 444 small ruminant farms throughout Greece (dashed line is the respective trendline; slope: 0.035,  $p = 0.49$ ).



**Figure S5.** Annual average relative humidity at 2 m from 1989 to 2019 among locations of 444 small ruminant farms throughout Greece (dashed line is the respective trendline; slope: 0.062,  $p = 0.12$ ).

**Table S2.** Average ( $\pm$  standard error of the mean) overall values of climatic parameters from 1989 to 2019 among locations of 444 small ruminant farms throughout Greece, in accord with the part of the country.

Part of the country	Temperature at 2 m ( $^{\circ}\text{C}$ )	Temperature of earth skin ( $^{\circ}\text{C}$ )	Minimum tempe- rature at 2 m ( $^{\circ}\text{C}$ )	Maximum tempe- rature at 2 m ( $^{\circ}\text{C}$ )	Temperature range at 2 m ( $^{\circ}\text{C}$ )	Relative humidity (%)	Precipitation (mm)	Wind speed at 10 m ( $\text{m s}^{-1}$ )
Central ( $n = 163$ )	$15.58 \pm 0.11$	$15.92 \pm 0.10$	$-4.28 \pm 0.38$	$39.22 \pm 0.31$	$43.50 \pm 0.50$	$67.6 \pm 0.4$	$1.60 \pm 0.05$	$2.22 \pm 0.01$
Islands ( $n = 59$ )	$18.48 \pm 0.09$	$19.70 \pm 0.09$	$4.84 \pm 0.22$	$32.68 \pm 0.18$	$27.84 \pm 0.28$	$71.7 \pm 0.2$	$1.52 \pm 0.05$	$4.30 \pm 0.02$
North ( $n = 123$ )	$13.44 \pm 0.12$	$13.62 \pm 0.11$	$-9.38 \pm 0.45$	$37.79 \pm 0.34$	$47.17 \pm 0.56$	$68.0 \pm 0.4$	$1.57 \pm 0.06$	$1.87 \pm 0.01$
South ( $n = 99$ )	$16.03 \pm 0.10$	$16.72 \pm 0.10$	$-2.16 \pm 0.26$	$38.45 \pm 0.31$	$40.61 \pm 0.42$	$68.3 \pm 0.3$	$1.55 \pm 0.05$	$2.67 \pm 0.01$



**Table S3.** Slope ( $\pm$  standard error of the mean) in change of the annual values of climatic parameters from 1989 to 2019 among locations of 444 small ruminant farms throughout Greece, in accord with the part of the country.

Part of the country	Temperature at 2 m (°C)	Temperature of earth skin (°C)	Minimum temperature at 2 m (°C)	Maximum temperature at 2 m (°C)	Temperature range at 2 m (°C)	Relative humidity (%)	Precipitation (mm)	Wind speed at 10 m (m s <sup>-1</sup> )
Changes for the period 1989-2019								
Central ( <i>n</i> = 163)	0.045 $\pm$ 0.009	0.041 $\pm$ 0.008	0.006 $\pm$ 0.044	0.048 $\pm$ 0.034	0.042 $\pm$ 0.057	0.069 $\pm$ 0.041	0.018 $\pm$ 0.005	-0.001 $\pm$ 0.001
Islands ( <i>n</i> = 59)	0.043 $\pm$ 0.007	0.040 $\pm$ 0.008	0.013 $\pm$ 0.026	0.031 $\pm$ 0.020	0.017 $\pm$ 0.032	0.004 $\pm$ 0.018	0.006 $\pm$ 0.005	-0.002 $\pm$ 0.002
North ( <i>n</i> = 123)	0.053 $\pm$ 0.010	0.047 $\pm$ 0.001	0.025 $\pm$ 0.052	0.044 $\pm$ 0.038	0.020 $\pm$ 0.064	0.090 $\pm$ 0.049	0.018 $\pm$ 0.005	-0.003 $\pm$ 0.002
South ( <i>n</i> = 99)	0.041 $\pm$ 0.009	0.036 $\pm$ 0.009	-0.004 $\pm$ 0.029	0.058 $\pm$ 0.034	0.062 $\pm$ 0.046	0.050 $\pm$ 0.038	0.014 $\pm$ 0.005	0.002 $\pm$ 0.002
Changes for the period 2014-2019								
Central ( <i>n</i> = 163)	0.067 $\pm$ 0.041	0.013 $\pm$ 0.047	-0.409 $\pm$ 0.553	-0.068 $\pm$ 0.360	0.341 $\pm$ 0.897	-0.356 $\pm$ 0.420	0.041 $\pm$ 0.030	0.019 $\pm$ 0.010
Islands ( <i>n</i> = 59)	0.052 $\pm$ 0.069	-0.148 $\pm$ 0.124	-0.173 $\pm$ 0.459	-0.137 $\pm$ 0.187	0.036 $\pm$ 0.585	-0.143 $\pm$ 0.240	0.055 $\pm$ 0.055	0.016 $\pm$ 0.029
North ( <i>n</i> = 123)	0.166 $\pm$ 0.039	0.150 $\pm$ 0.039	-0.209 $\pm$ 0.599	0.134 $\pm$ 0.443	0.343 $\pm$ 1.038	-1.060 $\pm$ 0.467	-0.100 $\pm$ 0.048	0.016 $\pm$ 0.010
South ( <i>n</i> = 99)	0.033 $\pm$ 0.054	-0.070 $\pm$ 0.083	-0.281 $\pm$ 0.385	-0.036 $\pm$ 0.410	0.245 $\pm$ 0.752	-0.161 $\pm$ 0.420	0.082 $\pm$ 0.051	0.030 $\pm$ 0.016

**Table S4.** Slope ( $\pm$  standard error of the mean) in change of the annual values of climatic parameters from 1989 to 2019 among locations of 444 small ruminant farms throughout Greece, in accord with the management system applied on the farms.

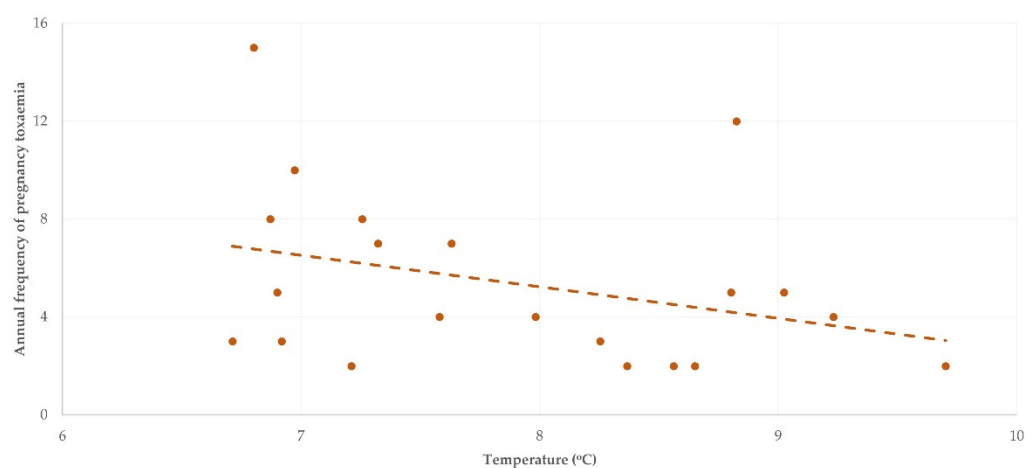
Management System Applied in Farms	Temperature at 2 m ( $^{\circ}\text{C}$ )	Temperature of earth skin ( $^{\circ}\text{C}$ )	Minimum tempe- rature at 2 m ( $^{\circ}\text{C}$ )	Maximum tempe- rature at 2 m ( $^{\circ}\text{C}$ )	Temperature range at 2 m ( $^{\circ}\text{C}$ )	Relative humidity (%)	Precipitation (mm)	Wind speed at 10 m ( $\text{m s}^{-1}$ )
Changes for the period 1989-2019								
Intensive ( $n = 52$ )	$0.047 \pm 0.009$	$0.044 \pm 0.009$	$0.011 \pm 0.043$	$0.046 \pm 0.034$	$0.035 \pm 0.056$	$0.069 \pm 0.043$	$0.016 \pm 0.005$	$-0.002 \pm 0.001$
Semi-intensive ( $n = 180$ )	$0.047 \pm 0.009$	$0.044 \pm 0.009$	$0.012 \pm 0.041$	$0.048 \pm 0.035$	$0.036 \pm 0.055$	$0.073 \pm 0.043$	$0.017 \pm 0.005$	$-0.001 \pm 0.001$
Semi-extensive ( $n = 168$ )	$0.046 \pm 0.008$	$0.045 \pm 0.008$	$0.009 \pm 0.036$	$0.046 \pm 0.031$	$0.037 \pm 0.048$	$0.055 \pm 0.036$	$0.016 \pm 0.005$	$-0.001 \pm 0.001$
Extensive ( $n = 44$ )	$0.044 \pm 0.008$	$0.044 \pm 0.008$	$0.008 \pm 0.032$	$0.045 \pm 0.028$	$0.037 \pm 0.043$	$0.047 \pm 0.032$	$0.014 \pm 0.005$	$-0.002 \pm 0.002$
Changes for the period 2014-2019								
Intensive ( $n = 52$ )	$0.087 \pm 0.044$	$0.084 \pm 0.053$	$-0.328 \pm 0.542$	$-0.056 \pm 0.387$	$0.272 \pm 0.910$	$-0.529 \pm 0.431$	$0.002 \pm 0.034$	$0.019 \pm 0.010$
Semi-intensive ( $n = 180$ )	$0.105 \pm 0.041$	$0.108 \pm 0.048$	$-0.314 \pm 0.514$	$0.019 \pm 0.391$	$0.333 \pm 0.891$	$-0.617 \pm 0.427$	$-0.009 \pm 0.040$	$0.019 \pm 0.009$
Semi-extensive ( $n = 168$ )	$0.082 \pm 0.044$	$0.078 \pm 0.045$	$-0.263 \pm 0.501$	$-0.022 \pm 0.343$	$0.241 \pm 0.832$	$-0.451 \pm 0.391$	$0.015 \pm 0.042$	$0.020 \pm 0.013$
Extensive ( $n = 44$ )	$0.066 \pm 0.052$	$0.057 \pm 0.049$	$-0.277 \pm 0.499$	$-0.074 \pm 0.307$	$0.203 \pm 0.760$	$-0.282 \pm 0.360$	$0.040 \pm 0.043$	$0.020 \pm 0.018$



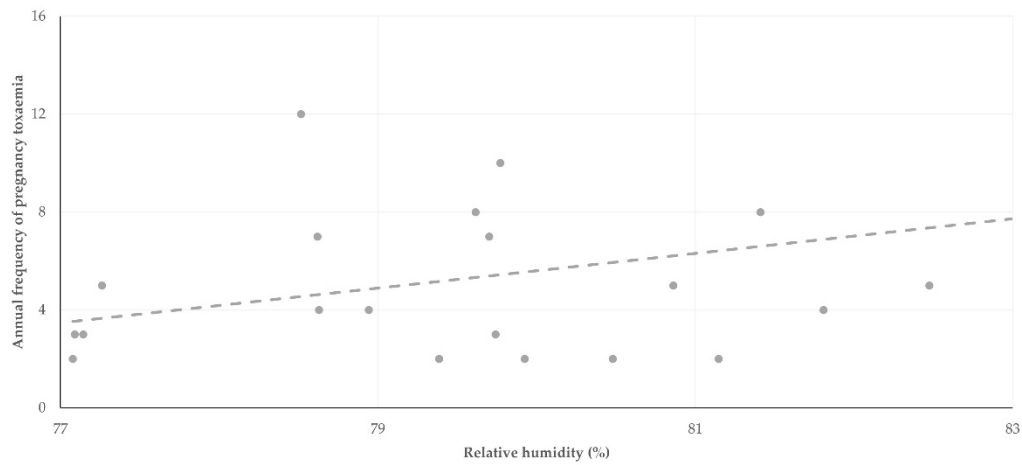
**Figure S6.** Annual average temperature at 2 m from 1989 to 2019 among locations of 444 small ruminant farms throughout Greece, in accord with the animal species farmed in the respective locations (brown: goats, green: sheep; dashed lines are respective trend-lines).

**Table S5.** Annual frequency of cases (a) pregnancy toxaemia, (b) clinical mastitis and (c) neonatal hypothermia in small ruminants, from 1989 to 2019, attended at the Department of Obstetrics and Reproduction of the Veterinary Faculty of the University of Thessaly.

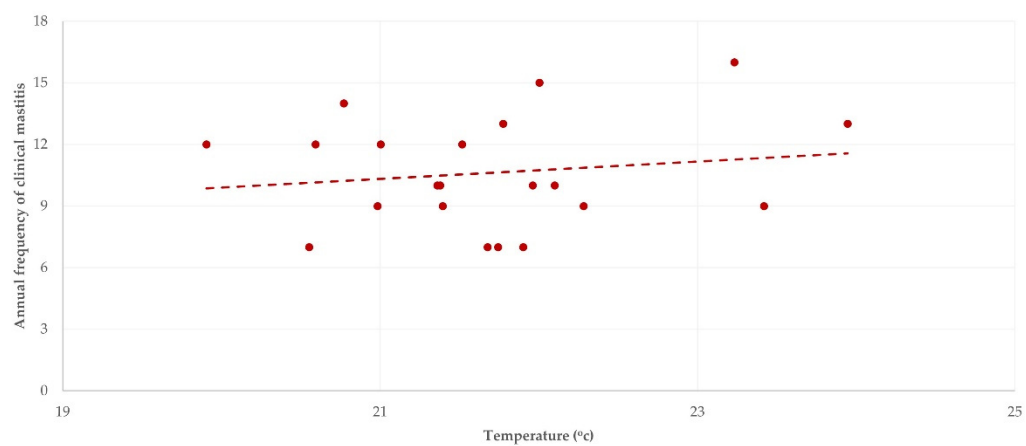
Year	No. of cases		
	Pregnancy toxaemia	Clinical mastitis	Neonatal hypothermia
1999	5	7	12
2000	7	7	16
2001	12	9	15
2002	10	7	23
2003	15	12	21
2004	8	9	22
2005	7	10	23
2006	8	12	21
2007	5	13	16
2008	4	16	20
2009	4	15	17
2010	5	10	17
2011	2	12	10
2012	3	10	12
2013	2	7	10
2014	4	9	7
2015	3	14	9
2016	2	13	7
2017	3	10	7
2018	3	9	6
2019	2	12	6



**Figure S7.** Scatterplot of annual average temperature at 2 m in the central part of Greece versus the annual frequency of cases of pregnancy toxemia attended at the Department of Obstetrics and Reproduction of the Veterinary Faculty of the University of Thessaly (dashed line is respective trendline;  $r = -0.326$ ,  $r = 0.07$ ).



**Figure S8.** Scatterplot of annual average of relative humidity at 2 m in the central part of Greece versus the annual frequency of cases of pregnancy toxemia attended at the Department of Obstetrics and Reproduction of the Veterinary Faculty of the University of Thessaly (dashed line is respective trendline;  $r = -0.359$ ,  $r = 0.06$ ).



**Figure S9.** Scatterplot of annual average temperature at 2 m in the central part of Greece versus the annual frequency of cases of clinical mastitis attended at the Department of Obstetrics and Reproduction of the Veterinary Faculty of the University of Thessaly (dashed line is respective trendline  $r = -0.026$ ,  $r = 0.46$ ).

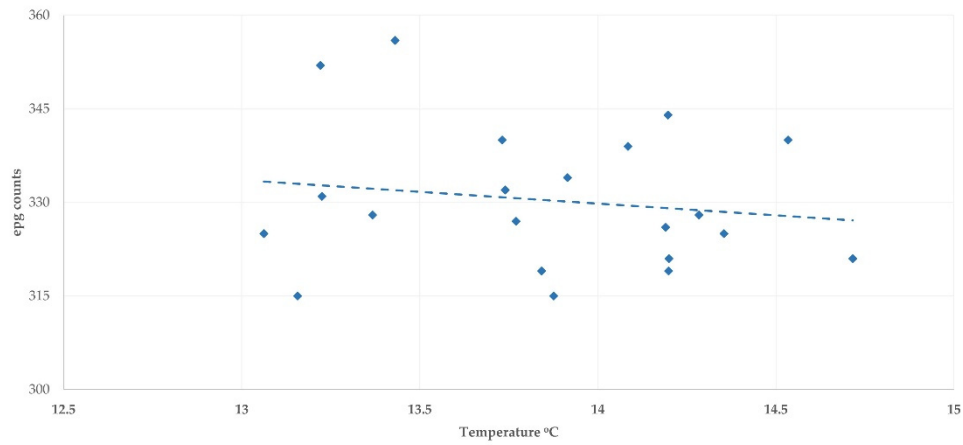
**Table S6.** Significance (*p* values) of the correlations between the annual frequency of cases of (a) pregnancy toxaemia, (b) clinical mastitis and (c) neonatal hypothermia attended at the Department of Obstetrics and Reproduction of the Veterinary Faculty of the University of Thessaly with the various climatic parameters that prevailed in the central part of Greece.

<b>Climatic parameters</b>	<b>Pregnancy Toxaemia</b>	<b>Clinical Mastitis</b>	<b>Neonatal Hypothermia</b>
Average temperature at 2 m (T2m)	0.07	0.46	0.039
Average temperature of earth skin (TS)	0.12	0.47	0.06
Minimum temperature at 2 m (T2mMin)	0.09	0.36	0.017
Maximum temperature at 2 m (T2mMax)	0.14	0.25	0.49
Temperature range at 2 m (T2mRan)	0.30	0.41	0.003
Average relative humidity at 2 m (RH2m)	0.06	0.46	0.06
Average precipitation (PREC)	0.28	0.49	0.38
Average wind speed at 10 m (WS10m)	0.008	0.29	0.017

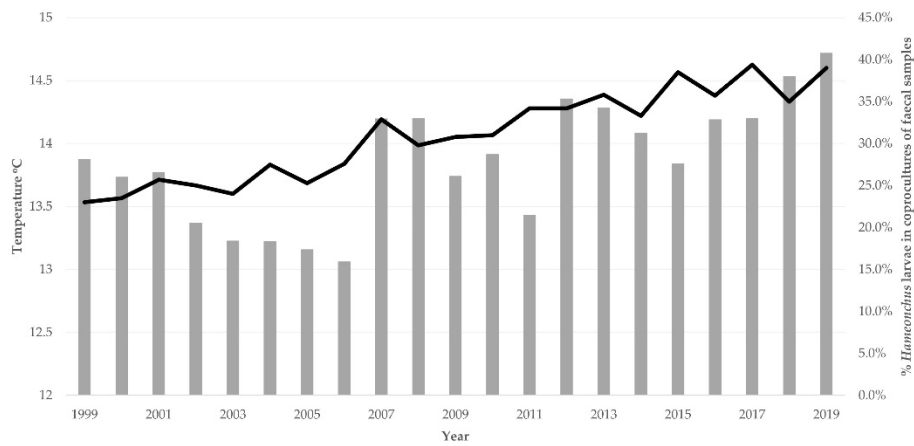


**Table S7.** Annual (a) overall average epg counts in faecal samples from small ruminants, (b) overall average proportion of *Haemonchus contortus* larvae found in coprocultures of samples from small ruminants and (c) frequency of cases of *H. contortus* resistance in small ruminants, as detected at the Laboratory of Parasitology and Parasitic Diseases of the Faculty of Veterinary Medicine of the Aristotle University of Thessaloniki.

Year ( <i>n</i> of samples tested)	Overall average epg counts in faecal samples	Overall average proportion of <i>H. contortus</i> larvae found in coprocultures	Frequency of cases of <i>H. contortus</i> resistance
1999 ( <i>n</i> = 859)	315	23.0%	0
2000 ( <i>n</i> = 1007)	340	23.5%	0
2001 ( <i>n</i> = 976)	327	25.7%	0
2002 ( <i>n</i> = 859)	328	25.0%	0
2003 ( <i>n</i> = 1116)	331	24.0%	0
2004 ( <i>n</i> = 956)	352	27.5%	0
2005 ( <i>n</i> = 859)	315	25.3%	0
2006 ( <i>n</i> = 1070)	325	27.6%	0
2007 ( <i>n</i> = 1165)	344	32.9%	0
2008 ( <i>n</i> = 975)	319	29.8%	1
2009 ( <i>n</i> = 1127)	332	30.8%	1
2010 ( <i>n</i> = 1261)	334	31.0%	0
2011 ( <i>n</i> = 1250)	356	34.2%	1
2012 ( <i>n</i> = 1090)	325	34.2%	2
2013 ( <i>n</i> = 1235)	328	35.8%	2
2014 ( <i>n</i> = 1256)	339	33.3%	5
2015 ( <i>n</i> = 1290)	319	38.5%	8
2016 ( <i>n</i> = 1165)	326	35.7%	14
2017 ( <i>n</i> = 1215)	321	39.4%	15
2018 ( <i>n</i> = 1266)	340	35.0%	16
2019 ( <i>n</i> = 1225)	321	39.0%	19



**Figure S10.** Scatterplot of annual average Earth skin temperature in the north part of Greece versus the annual average epg counts in faecal samples from small ruminants as reported by the Laboratory of Parasitology and Parasitic Diseases of the Faculty of Veterinary Medicine of the Aristotle University of Thessaloniki (dashed line is respective trendline;  $r = -0.157$ ,  $r = 0.25$ ).



**Figure S11.** Annual average Earth skin temperature in the north part of Greece (grey bars) and annual average % of *Haemonchus contortus* larvae in coprocultures from faecal samples from small ruminants as reported by the Laboratory of Parasitology and Parasitic Diseases of the Faculty of Veterinary Medicine of the Aristotle University of Thessaloniki (black line), from 1999 to 2019.

**Table S8.** Significance (*p* values) of the correlations between (a) annual average epg counts in faecal samples, (b) annual average proportion of *Haemonchus contortus* larvae in coprocultures of faecal samples and (c) annual frequency of cases of *H. contortus* resistance as reported by the Laboratory of Parasitology and Parasitic Diseases of the Faculty of Veterinary Medicine of the Aristotle University of Thessaloniki with the various climatic parameters that prevailed in the north part of Greece.

Climatic parameters	epg Counts in Faecal Samples	% <i>H. contortus</i> Larvae in Copro-cultures of Faecal Samples	Cases of <i>Haemonchus</i> Resistance
Average temperature at 2 m (T2m)	0.25	< 0.0001	0.0003
Average temperature of earth skin (TS)	0.25	0.0004	0.0007
Minimum temperature at 2 m (T2mMin)	0.12	0.11	0.39
Maximum temperature at 2 m (T2mMax)	0.35	0.29	0.11
Temperature range at 2 m (T2mRan)	0.12	0.09	0.20
Average relative humidity at 2 m (RH2m)	0.46	0.26	0.24
Average precipitation (PREC)	0.28	0.29	0.40
Average wind speed at 10 m (WS10m)	0.27	0.07	0.23