

Supplementary Section S1. Descriptions of sample size reduction

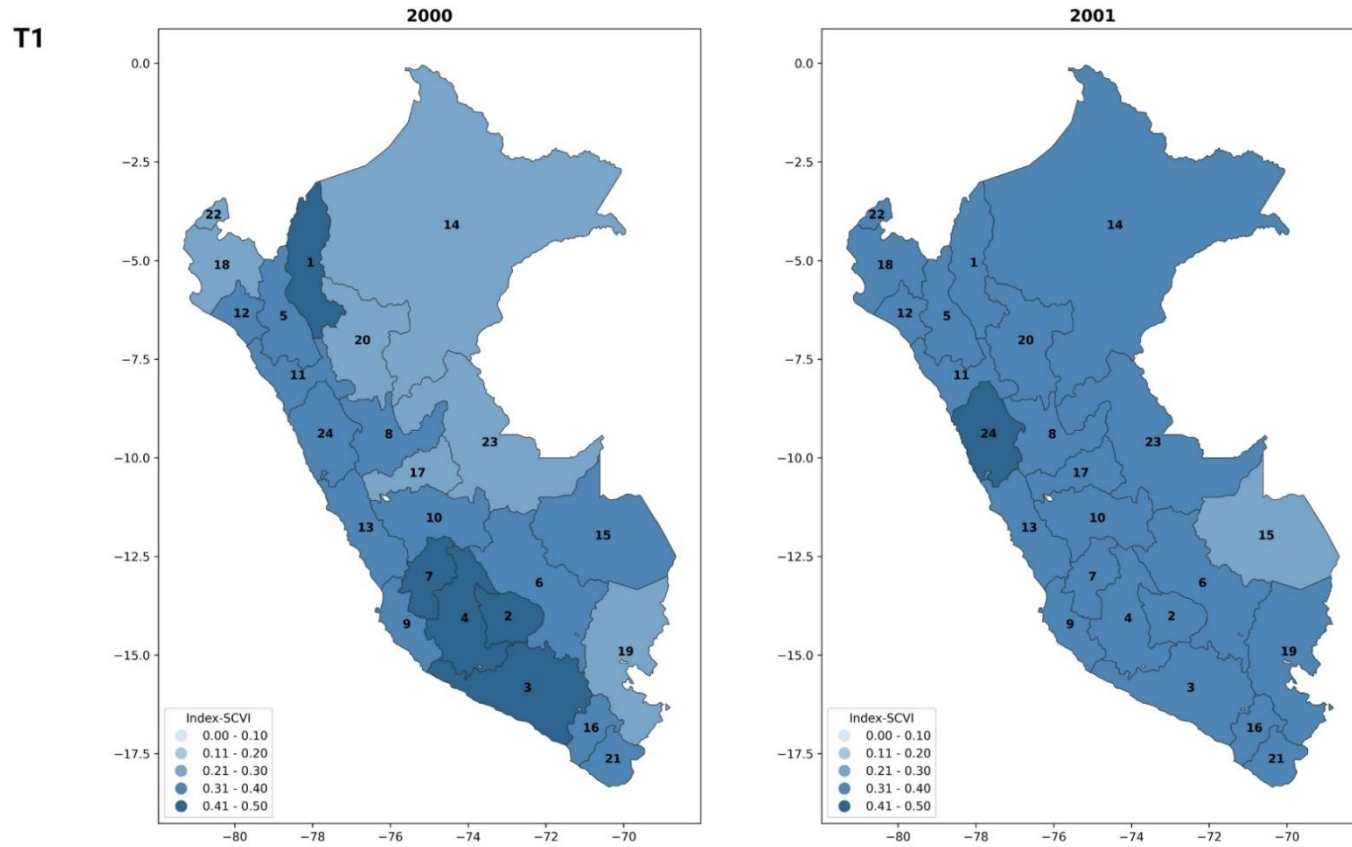
Table S1: Data cleaning procedures for components and subcomponents.

Major components	Sub-component	Sub-component data range	Data cleaning procedure
Demographic and educational (E)	Percentage of households where the head of the household has a low level of education	- No education - Early childhood education - Incomplete primary - Completed primary school - Incomplete secondary education - Complete secondary education - Incomplete non-university higher education - Complete non-university higher education - Incomplete university education - University preparatory program - Completed university education - Graduate degree	The consistency of the educational level categories recorded in the survey was verified; 790 observations with missing values were identified, corresponding to responses not reported by the respondent. These observations were excluded from the analyses to avoid biases resulting from incomplete information (f=790; fr%=0.96).
	Average age of the head of the household	Between 15 and 98 years	The presence of missing values and possible outliers in the household head's age variable was verified. The observed age fell within the demographic range of 15 to 98 years, so no missing or inconsistent values were identified, and it was not necessary to exclude any observations.
	Percentage of female-headed households	- Male - Female	The consistency of the household head's gender variable was reviewed to identify missing values or invalid categories; all observations contained valid and correctly coded information, so no missing or inconsistent values were recorded, and no observations were excluded.
	Percentage of single-parent households	- Married - Living together - Separated - Divorced - Widowed - Single	The consistency of the marital status categories was evaluated; all responses corresponded to the valid categories defined in the survey, so no missing values or invalid codes were identified. Consequently, no exclusions were made for this variable.
Productive - economic (P)	Total value of production	Monetary values of production (S/.) ≥ 0	The total value of production was calculated as the sum of the value of agricultural, livestock, forestry, and by-product production. Observations with negative values or missing information in any of the production components were identified, representing economic inconsistencies. Since the monetary value of production cannot be negative or inconsistent, these observations were excluded from the analysis (f=3,838; fr%=0.57).

	Percentage of households dependent principally on agriculture for their livelihood	• Self-employed • Employer • Laborer • Employee • Household worker	The consistency of the occupational categories reported by the head of household was checked, special characters resulting from the survey digitization process were removed, and the validity of the categories was verified; no missing values or invalid codes were identified in this variable
	Recovery time following a climate shock	• Less than 6 months • Between 6 and 12 months • More than one year • No solution • Don't know	The consistency of responses regarding the estimated recovery time following an adverse event was verified; 69,297 observations with missing or invalid responses were identified, corresponding to households that did not report information on recovery time or whose response was not interpretable. These observations were excluded from the analysis to avoid bias in the measurement of resilience (f=69,297; fr%=84.21).
Resilience (R)	Percentage of agricultural households that implemented household response strategies following a climate shock	• Spending savings or capital • Pawning assets • Selling assets • Borrow from family or friends • Borrow money from work • Use insurance • Work longer hours • Have other household members join the workforce • Receive government assistance • Receive assistance from nongovernmental organizations • Cut back on spending or food • Borrow money from other sources • Receive help from family members • Take other unspecified actions • Do not adopt any strategy	The completeness of the data was assessed for the variables recording the response strategies implemented by households. A total of 61,834 observations were identified in which none of the strategies were reported, indicating insufficient information to calculate the total number of strategies used; these observations were excluded from the calculation of the response capacity indicator (f=61,834; fr%=75.14).
Climate vulnerability (V)	Percentage of farming households exposed to a climate shock	Your household was affected by natural disasters in the last 12 months. • Yes • No	The variable was standardized by removing special characters and verifying the consistency of the responses; subsequently, 17,866 observations with missing values were identified, corresponding to households that did not report information on the occurrence of natural disasters; these observations were excluded from the analyses related to exposure to climate events (f=17,866; fr%=21.71).
	Percentage of farming households reporting an impact on income and assets	• Decrease in income • Loss of property • Both • None	The consistency of the categories describing the impact of the climate event on the household was verified; 60,974 observations with missing values or unrecorded responses were identified, so these observations were excluded from the analysis of the impact of climate shocks to ensure the consistency of the estimates (f=60,974; fr%=74.04).

f = Absolute frequency; fr%=Relative frequency (percentage)

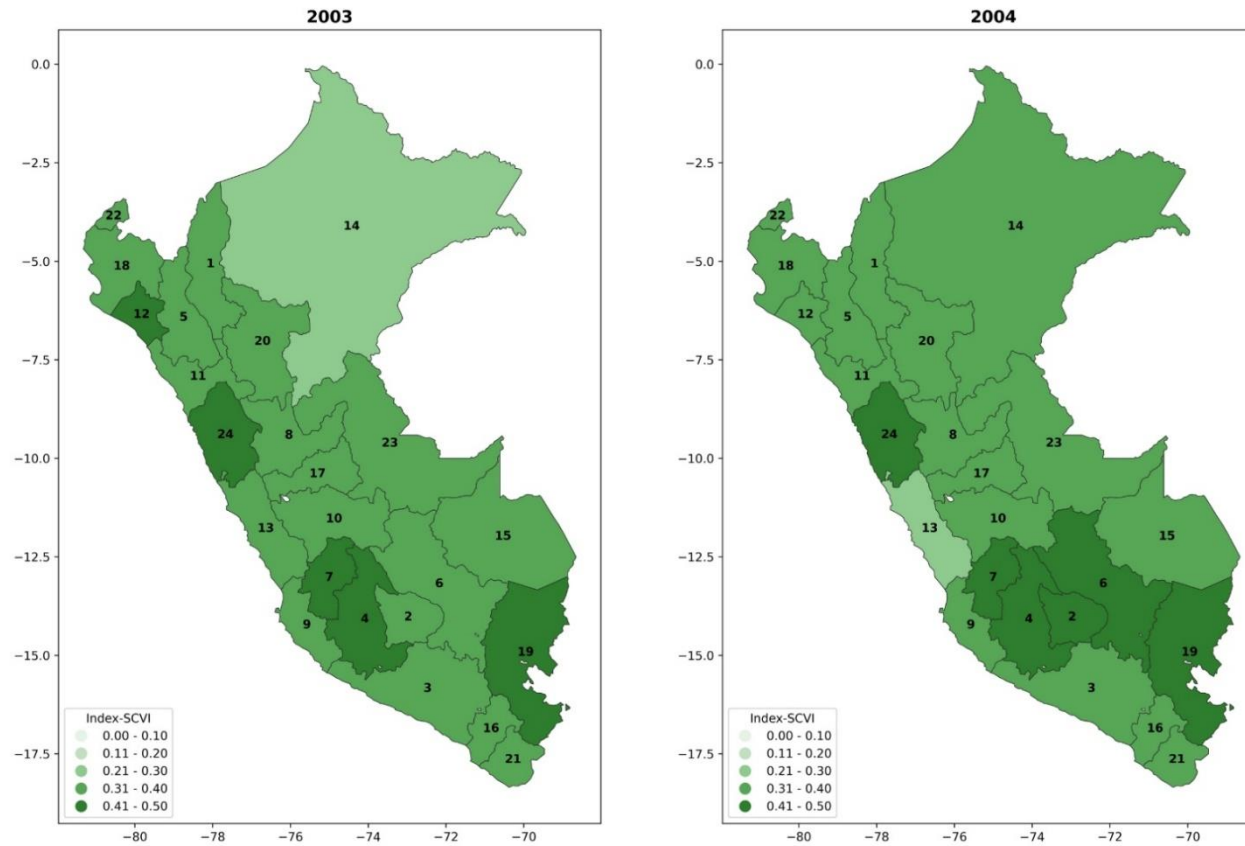
Supplementary Section S2



Peruvian region: 1=Amazonas; 2=Apurímac; 3=Arequipa; 4=Ayacucho; 5=Cajamarca; 6=Cusco; 7=Huancavelica; 8=Huánuco; 9=Ica; 10=Junín; 11=La Libertad; 12=Lambayeque; 13=Lima; 14=Loreto; 15=Madre de Dios; 16=Moquegua; 17=Pasco; 18=Piura; 19=Puno; 20=San Martín; 21=Tacna; 22=Tumbes; 23=Ucayali; 24=Áncash. Source: Elaborated for the authors.

Figure S1: Results of Overall SCVI for each Peruvian region from T1 (2000-2001).

T2



Peruvian region: 1=Amazonas; 2=Apurímac; 3=Arequipa; 4=Ayacucho; 5=Cajamarca; 6=Cusco; 7=Huancavelica; 8=Huánuco; 9=Ica; 10=Junín; 11=La Libertad; 12=Lambayeque; 13=Lima; 14=Loreto; 15=Madre de Dios; 16=Moquegua; 17=Pasco; 18=Piura; 19=Puno; 20=San Martín; 21=Tacna; 22=Tumbes; 23=Ucayali; 24=Áncash. Source: Elaborated for the authors.

Figure S2: Results of Overall SCVI for each Peruvian region from T2 (2003-2004).

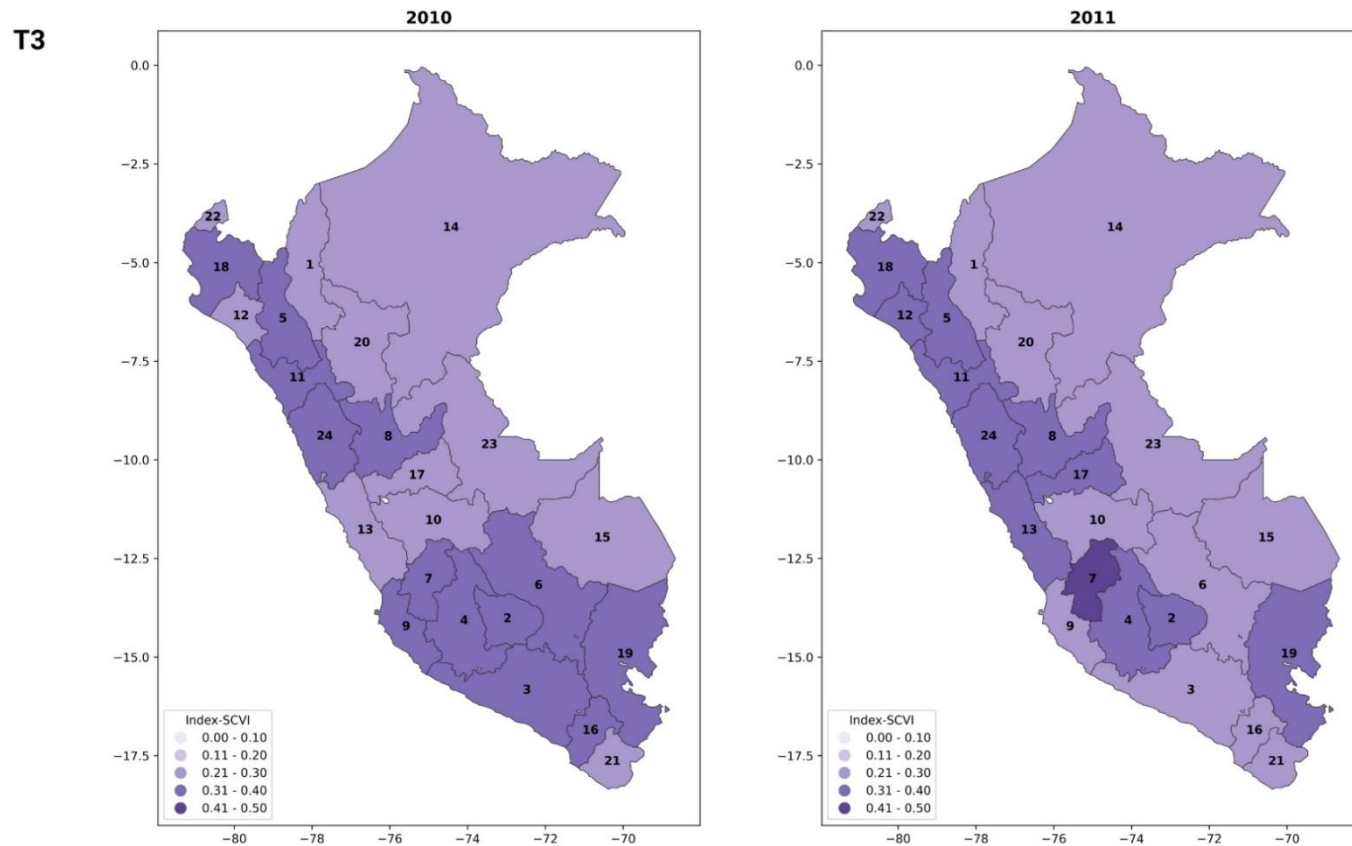
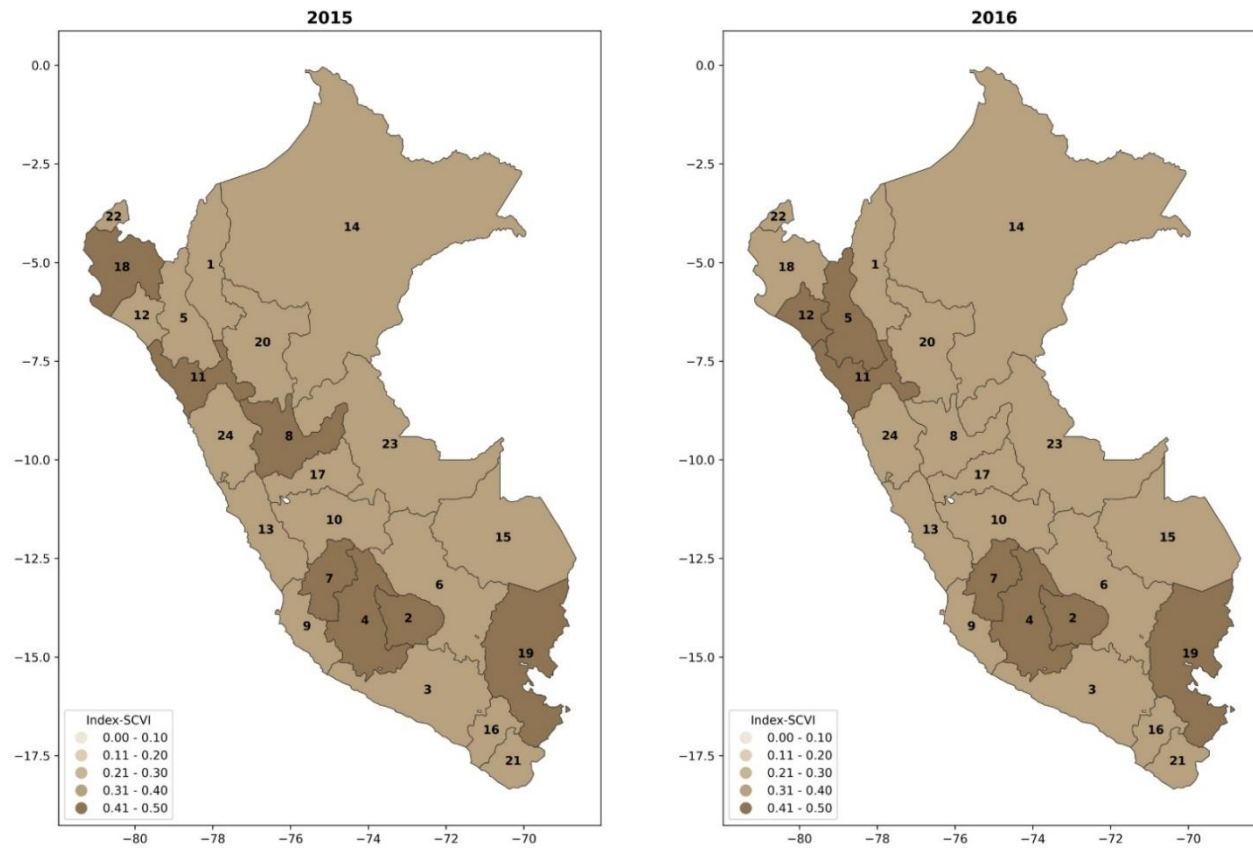


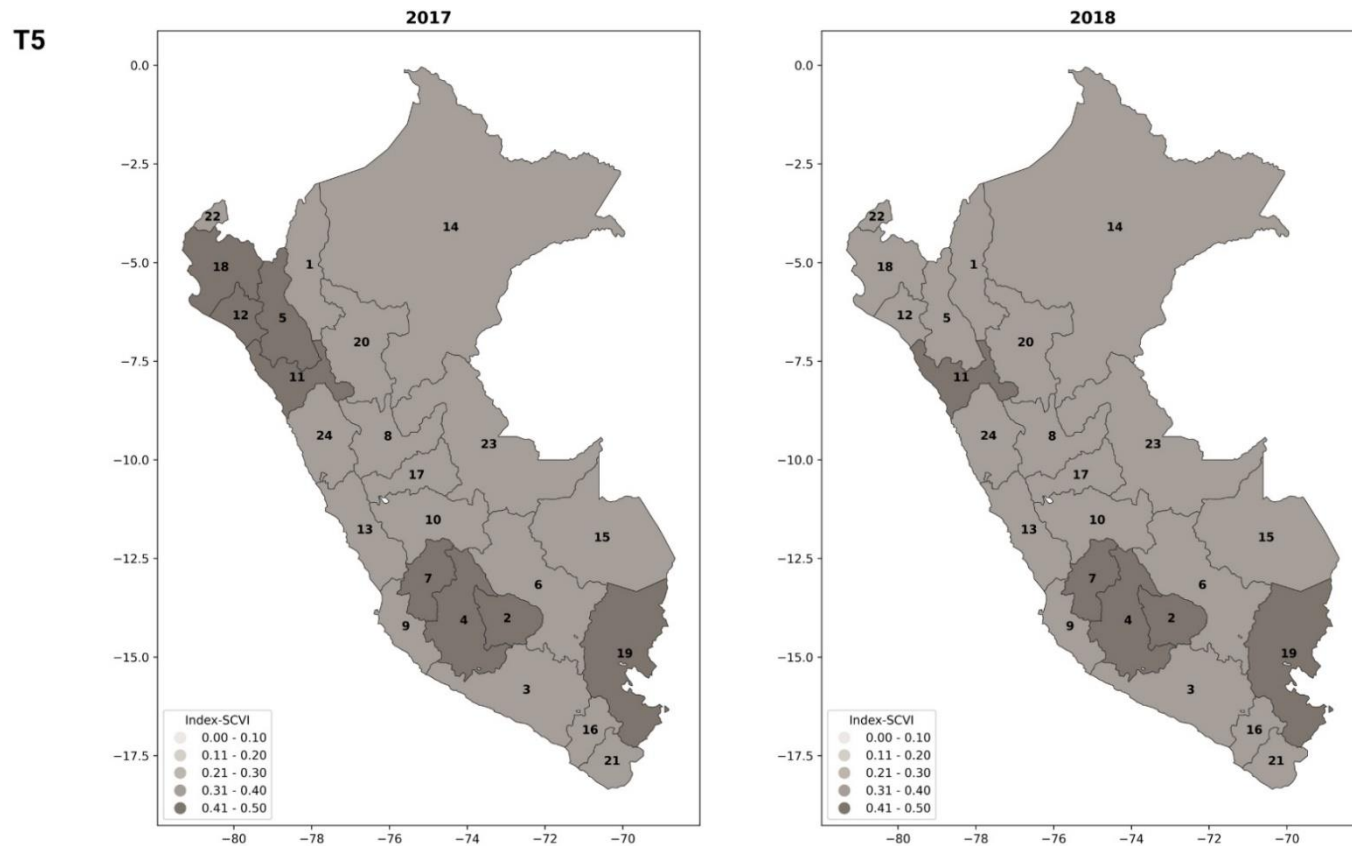
Figure S3: Results of Overall SCVI for each Peruvian region from T1 (2010-2011).

T4



Peruvian region: 1=Amazonas; 2=Apurímac; 3=Arequipa; 4=Ayacucho; 5=Cajamarca; 6=Cusco; 7=Huancavelica; 8=Huánuco; 9=Ica; 10=Junín; 11=La Libertad; 12=Lambayeque; 13=Lima; 14=Loreto; 15=Madre de Dios; 16=Moquegua; 17=Pasco; 18=Piura; 19=Puno; 20=San Martín; 21=Tacna; 22=Tumbes; 23=Ucayali; 24=Áncash. Source: Elaborated for the authors.

Figure S4: Results of Overall SCVI for each Peruvian region from T1 (2015-2016).



Peruvian region: 1=Amazonas; 2=Apurímac; 3=Arequipa; 4=Ayacucho; 5=Cajamarca; 6=Cusco; 7=Huancavelica; 8=Huánuco; 9=Ica; 10=Junín; 11=La Libertad; 12=Lambayeque; 13=Lima; 14=Loreto; 15=Madre de Dios; 16=Moquegua; 17=Pasco; 18=Piura; 19=Puno; 20=San Martín; 21=Tacna; 22=Tumbes; 23=Ucayali; 24=Áncash. Source: Elaborated for the authors.

Figure S5: Results of Overall SCVI for each Peruvian region from T1 (2017-2018).

Supplementary Section S3

Table S2: Results of sub-component indicators for each Peruvian region from T1 to T5 (2000-2018).

MC	T	Year	Region																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
(E)	T1	2000	0.352	0.443	0.430	0.428	0.392	0.348	0.505	0.489	0.342	0.395	0.343	0.309	0.364	0.273	0.248	0.410	0.317	0.339	0.395	0.329	0.475	0.356	0.371	0.416
		2001	0.360	0.345	0.383	0.422	0.376	0.358	0.403	0.377	0.353	0.338	0.357	0.350	0.350	0.311	0.283	0.347	0.358	0.356	0.403	0.311	0.389	0.360	0.304	0.410
	T2	2003	0.353	0.346	0.335	0.440	0.368	0.351	0.386	0.375	0.340	0.365	0.379	0.383	0.341	0.293	0.279	0.364	0.363	0.357	0.401	0.308	0.377	0.327	0.304	0.395
		2004	0.367	0.354	0.341	0.431	0.373	0.358	0.383	0.347	0.305	0.342	0.378	0.398	0.335	0.313	0.292	0.399	0.371	0.359	0.413	0.311	0.367	0.368	0.302	0.400
	T3	2010	0.347	0.405	0.402	0.418	0.444	0.421	0.417	0.411	0.412	0.406	0.395	0.381	0.357	0.287	0.333	0.447	0.366	0.402	0.468	0.336	0.354	0.389	0.346	0.419
		2011	0.357	0.412	0.349	0.424	0.432	0.368	0.414	0.413	0.346	0.390	0.415	0.377	0.384	0.313	0.323	0.387	0.383	0.406	0.406	0.343	0.351	0.367	0.315	0.408
	T4	2015	0.352	0.425	0.345	0.409	0.400	0.413	0.421	0.407	0.365	0.420	0.411	0.416	0.366	0.321	0.293	0.444	0.389	0.400	0.460	0.314	0.379	0.342	0.304	0.412
		2016	0.358	0.406	0.365	0.393	0.410	0.396	0.409	0.406	0.367	0.401	0.409	0.391	0.330	0.314	0.307	0.380	0.380	0.371	0.449	0.328	0.351	0.344	0.323	0.400
	T5	2017	0.370	0.391	0.364	0.407	0.419	0.391	0.422	0.394	0.382	0.393	0.412	0.418	0.342	0.304	0.296	0.396	0.377	0.385	0.461	0.339	0.363	0.325	0.339	0.383
		2018	0.358	0.443	0.380	0.424	0.437	0.398	0.431	0.414	0.439	0.415	0.400	0.443	0.359	0.316	0.337	0.417	0.406	0.418	0.468	0.342	0.358	0.362	0.326	0.424
(P)	T1	2000	0.146	0.224	0.442	0.176	0.179	0.107	0.470	0.099	0.184	0.124	0.086	0.289	0.219	0.173	0.131	0.211	0.194	0.165	0.155	0.111	0.243	0.246	0.111	0.281
		2001	0.150	0.172	0.226	0.236	0.249	0.177	0.166	0.137	0.144	0.107	0.180	0.208	0.153	0.155	0.124	0.083	0.144	0.160	0.196	0.083	0.114	0.123	0.143	0.259
	T2	2003	0.130	0.203	0.168	0.206	0.197	0.185	0.210	0.129	0.197	0.082	0.239	0.111	0.239	0.078	0.071	0.154	0.253	0.125	0.180	0.098	0.093	0.104	0.133	0.262
		2004	0.103	0.238	0.180	0.189	0.232	0.152	0.206	0.103	0.242	0.072	0.193	0.234	0.190	0.088	0.108	0.164	0.161	0.199	0.219	0.097	0.120	0.178	0.130	0.264
	T3	2010	0.068	0.144	0.128	0.117	0.181	0.107	0.149	0.104	0.169	0.087	0.219	0.213	0.158	0.086	0.074	0.104	0.110	0.174	0.143	0.090	0.117	0.135	0.062	0.109
		2011	0.119	0.200	0.200	0.155	0.191	0.130	0.147	0.107	0.273	0.151	0.270	0.366	0.260	0.113	0.103	0.175	0.159	0.213	0.145	0.149	0.183	0.192	0.066	0.209
	T4	2015	0.086	0.109	0.079	0.134	0.123	0.085	0.135	0.099	0.171	0.104	0.243	0.246	0.169	0.095	0.109	0.108	0.120	0.179	0.149	0.094	0.140	0.197	0.042	0.110
		2016	0.132	0.209	0.125	0.169	0.189	0.098	0.156	0.140	0.255	0.159	0.307	0.341	0.166	0.139	0.122	0.111	0.174	0.252	0.187	0.125	0.148	0.207	0.129	0.172
	T5	2017	0.134	0.184	0.164	0.151	0.162	0.120	0.139	0.143	0.235	0.173	0.277	0.376	0.204	0.128	0.174	0.137	0.143	0.247	0.180	0.100	0.140	0.248	0.117	0.157
		2018	0.070	0.138	0.088	0.151	0.130	0.122	0.166	0.135	0.124	0.115	0.228	0.153	0.178	0.108	0.109	0.136	0.139	0.141	0.230	0.072	0.101	0.085	0.108	0.083
(R)	T1	2000	0.961	1.000	1.000	0.987	0.989	0.833	0.985	0.717	0.944	0.952	0.972	1.000	0.975	0.744	1.000	0.489	0.492	0.492	0.492	0.505	0.475	0.500	0.484	0.449
		2001	0.893	0.864	0.791	0.866	0.882	0.800	0.858	0.826	0.695	0.866	0.868	0.965	0.833	0.894	0.729	0.625	0.863	0.803	0.760	0.849	0.803	0.833	0.817	0.900
	T2	2003	0.858	0.875	0.879	0.975	0.857	0.796	0.982	0.921	0.745	0.921	0.809	0.989	0.980	0.740	0.858	0.803	0.819	0.930	0.922	0.930	0.697	0.798	0.901	0.917
		2004	0.915	0.999	0.936	0.949	0.893	0.987	0.978	0.983	0.667	0.961	0.851	0.855	0.496	0.940	0.881	0.901	0.949	0.927	0.988	0.951	0.896	0.800	0.903	0.953
	T3	2010	0.475	0.464	0.490	0.475	0.488	0.452	0.467	0.494	0.475	0.454	0.474	0.478	0.484	0.494	0.490	0.476	0.439	0.490	0.477	0.456	0.464	0.483	0.489	0.480
		2011	0.440	0.459	0.446	0.463	0.461	0.430	0.481	0.479	0.454	0.402	0.457	0.457	0.472	0.472	0.454	0.456	0.392	0.474	0.475	0.446	0.431	0.461	0.466	0.471
	T4	2015	0.917	0.981	0.918	0.966	0.920	0.891	0.958	0.946	0.989	0.849	0.878	0.858	0.888	0.807	0.814	0.777	0.941	0.915	0.942	0.938	0.878	0.851	0.916	0.946
		2016	0.919	0.952	0.809	0.974	0.922	0.916	0.957	0.910	0.835	0.926	0.864	0.888	0.856	0.811	0.886	0.857	0.892	0.899	0.941	0.916	0.861	0.798	0.896	0.925
	T5	2017	0.894	0.965	0.840	0.926	0.923	0.893	0.874	0.860	0.841	0.897	0.913	0.851	0.798	0.852	0.888	0.811	0.854	0.866	0.799	0.889	0.863	0.796	0.837	0.922

(V)	T1	2018	0.928	0.935	0.871	0.946	0.894	0.880	0.874	0.903	0.869	0.881	0.911	0.876	0.886	0.880	0.932	0.867	0.860	0.887	0.790	0.941	0.905	0.801	0.841	0.906
		2000	0.338	0.000	0.000	0.003	0.004	0.000	0.005	0.005	0.008	0.008	0.000	0.000	0.015	0.004	0.000	0.006	0.003	0.015	0.005	0.002	0.010	0.000	0.008	0.014
		2001	0.015	0.030	0.185	0.039	0.092	0.117	0.059	0.095	0.051	0.069	0.035	0.034	0.110	0.079	0.078	0.198	0.118	0.069	0.225	0.048	0.158	0.050	0.037	0.073
	T2	2003	0.004	0.135	0.048	0.062	0.031	0.163	0.116	0.014	0.048	0.026	0.028	0.201	0.000	0.029	0.097	0.054	0.108	0.049	0.209	0.019	0.193	0.050	0.012	0.089
		2004	0.029	0.143	0.040	0.024	0.018	0.182	0.131	0.028	0.003	0.013	0.022	0.042	0.126	0.020	0.184	0.044	0.142	0.126	0.136	0.050	0.116	0.035	0.007	0.022
	T3	2010	0.132	0.170	0.098	0.080	0.024	0.184	0.495	0.100	0.077	0.123	0.061	0.008	0.008	0.092	0.132	0.067	0.213	0.038	0.375	0.095	0.069	0.041	0.013	0.092
		2011	0.097	0.209	0.098	0.104	0.067	0.148	0.547	0.124	0.045	0.119	0.113	0.066	0.027	0.155	0.123	0.074	0.239	0.064	0.466	0.105	0.053	0.037	0.101	0.146
	T4	2015	0.115	0.074	0.111	0.113	0.070	0.095	0.305	0.167	0.011	0.081	0.126	0.045	0.096	0.173	0.100	0.127	0.122	0.155	0.478	0.092	0.082	0.166	0.116	0.092
		2016	0.030	0.120	0.087	0.129	0.069	0.056	0.250	0.075	0.078	0.037	0.074	0.047	0.027	0.077	0.065	0.045	0.089	0.104	0.195	0.049	0.081	0.040	0.109	0.039
	T5	2017	0.036	0.178	0.063	0.151	0.100	0.106	0.338	0.175	0.094	0.060	0.178	0.211	0.113	0.134	0.084	0.070	0.240	0.209	0.482	0.069	0.146	0.191	0.071	0.132
		2018	0.022	0.055	0.061	0.145	0.059	0.066	0.235	0.080	0.049	0.031	0.079	0.069	0.090	0.040	0.018	0.039	0.134	0.113	0.246	0.025	0.049	0.115	0.023	0.097

MC=Major components. (E)=Demographic and educational; (P)=Productive-economic; (R)=Resilience; (V)=Climate vulnerability. T = Temporary layers. Peruvian region: 1=Amazonas; 2=Apurímac; 3=Arequipa; 4=Ayacucho; 5=Cajamarca; 6=Cusco; 7=Huancavelica; 8=Huánuco; 9=Ica; 10=Junín; 11=La Libertad; 12=Lambayeque; 13=Lima; 14=Loreto; 15=Madre de Dios; 16=Moquegua; 17=Pasco; 18=Piura; 19=Puno; 20=San Martín; 21=Tacna; 22=Tumbes; 23=Ucayali; 24=Áncash. Source: Elaborated for the authors.

Table S3: Calculating the sub-component indicators for the SCVI for Peruvian region.

Calculation of the Climate Vulnerability major component for SCVI for <i>Piura</i> ₂₀₁₇	
$Index_{S_r} = \frac{S_r - S_{min}}{S_{max} - S_{min}}$	Natural disaster report (<i>Piura</i>₂₀₁₇) = $\frac{(10.28-0)}{(100-0)} = 0.103$ Impact of the adverse climate event reported (<i>Piura</i>₂₀₁₇) = $\frac{(31.52-0)}{(100-0)} = 0.315$
$M_r = \frac{\sum_{i=1}^n index_{S_{ri}}}{n}$	Climate vulnerability (<i>Piura</i>₂₀₁₇) = $\frac{(0.103+0.315)}{(2)} = 0.209$
$SCVI_r = \frac{\sum_{i=1}^4 W_{M_i} M_{ri}}{\sum_{i=1}^4 W_{M_i}}$	SCVI (<i>Piura</i>₂₀₁₇) = $\frac{(4)(0.385)+(2)(0.247)+(2)(0.866)+(2)(0.209)}{4+2+2+2} = 0.418$