Supplementary material

Supplementary Table 1. Departmental flood statistics (SA = settlements affected; PA = people affected; HD = houses destroyed; CL = crop losses (ha); LL = livestock losses Y = number of years with almost a flood).

DEPARTMENT	REGION	SA	PA	HD	CL (ha)	LL (TLU)	YEARS
ABALA	TILLABERI	54	22263	1140	151	1646	2007; 2009; 2012; 2013; 2015
ABALAK	TAHOUA	1	4437	570	52	6	2011
ADERBISSINAT	AGADEZ	8	15931	223	1	2382	2010; 2013
AGUIE	MARADI	36	14420	1384	158	3	2001; 2010; 2013; 2014; 2015
ARLIT	AGADEZ	34	9085	166	19	556	2005; 2007; 2009; 2010; 2011; 2013; 2015
AYEROU	TILLABERI	8	3430	25	197	2480	2008; 2010; 2012
BAGAROUA	TAHOUA	25	9780	251	0	28	2014; 2015
BALLEYARA	TILLABERI	41	14446	13	2697	2	2006; 2010; 2011; 2012; 2014
BANIBANGOU	TILLABERI	7	1400	154	204	3574	2006; 2010; 2012
BANKILARE	TILLABERI	0	0	0	0	0	
BELBEDJI	ZINDER	1	553	5	0	0	2010
BERMO	MARADI	10	12281	73	0	933	2010; 2014; 2015
BILMA	AGADEZ	0	0	0	0	0	
BIRNI NKONNI	TAHOUA	27	28842	343	274	1	1999; 2006; 2008; 2014; 2015
BOBOYE	DOSSO	159	30208	3412	2685	1	1999; 2000; 2003; 2006; 2008; 2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016
BOSSO	DIFFA	13	2448	414	24	0	2007; 2012
BOUZA	TAHOUA	9	2070	303	28	0	2007; 2015
DAKORO	MARADI	20	15779	728	59	2	2001; 2010; 2012; 2013; 2014; 2015
DAMAGARAM TAKAYA	ZINDER	13	10478	876	777	596	2002; 2009; 2010; 2013; 2014
DIFFA	DIFFA	23	2856	271	0	0	1999; 2010; 2012; 2013
DIOUNDIOU	DOSSO	55	14621	1577	1660	0	2009; 2010; 2012; 2013
DOGONDOUTCHI	DOSSO	128	52774	3245	577	23	1999; 2002; 2003; 2005; 2006; 2008; 2009; 2010; 2012; 2013; 2014; 2015; 2016
DOSSO	DOSSO	355	90610	12097	5877	18	1999; 2000; 2003; 2007; 2008; 2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016
DUNGASS	ZINDER	27	2873	318	55	0	2007; 2010; 2014; 2015
FALMEY	DOSSO	33	14063	1313	1354	4	2010; 2012; 2013; 2015

FILINGUE	TILLABERI	198	50932	2097	9000	35	1999; 2001; 2003; 2006; 2010; 2011; 2012; 2013
GAYA	DOSSO	202	86768	4570	10198	7	1999; 2003; 2010; 2011; 2012; 2013; 2015; 2016
GAZAOUA	MARADI	10	6931	445	374	0	2010; 2013
GOTHEYE	TILLABERI	55	22148	1719	1159	7	2007; 2010; 2011; 2012; 2013; 2015
GOUDOUMARIA	DIFFA	5	943	62	30	0	2010; 2012; 2013
GOURE	ZINDER	16	8141	1203	70	1873	2010; 2013; 2014; 2015
GUIDAN-ROUMDJI	MARADI	60	16052	1391	682	39	1999; 2000; 2001; 2006; 2010; 2012; 2013; 2014; 2015
IFEROUANE	AGADEZ	20	5573	102	21371	777	2005; 2006; 2010; 2014; 2015
ILLELA	TAHOUA	40	36828	1000	289	26	2007; 2010; 2013; 2014
INGALL	AGADEZ	21	11740	649	89	1139	2006; 2009; 2010; 2013
KANTCHE	ZINDER	1	12264	1279	0	0	2007; 2011
KEITA	TAHOUA	4	1947	97	55	0	2007; 2010; 2015
KOLLO	TILLABERI	249	247466	14498	56988	68	2001; 2002; 2003; 2006; 2007; 2009; 2010; 2011; 2012; 2013; 2014; 2015
LOGA	DOSSO	22	7235	528	693	0	1999; 2000; 2012; 2015
MADAOUA	TAHOUA	48	20638	1089	1749	17	1999; 2001; 2002; 2003; 2005; 2006; 2007; 2008; 2009; 2010; 2013; 2015
MADAROUNFA	MARADI	298	23291	1545	596	0	2010; 2011; 2012; 2013; 2014; 2015
MAGARIA	ZINDER	66	25070	2416	883	2	1999; 2001; 2010; 2013; 2014; 2015
MAINE-SOROA	DIFFA	18	25960	846	500	0	2003; 2007; 2010; 2012; 2013; 2015
MALBAZA	TAHOUA	2	2040	245	0	1	2013
MAYAHI	MARADI	38	21438	922	26	48	1999; 2010; 2013; 2014; 2015
MIRRIAH	ZINDER	83	22433	1823	98	8	1999; 2001; 2003; 2007; 2008; 2010; 2013; 2015
NGOURTI	DIFFA	3	700	86	0	0	2010; 2012
NGUIGMI	DIFFA	23	4675	613	0	3	2007; 2012; 2013; 2015
OUALLAM	TILLABERI	184	43079	2386	7779	699	2005; 2006; 2007; 2010; 2011; 2012; 2013; 2014; 2015
SAY	TILLABERI	175	94199	2989	13295	24	1998; 1999; 2001; 2003; 2004; 2011; 2012; 2013; 2014; 2015
TAHOUA	TAHOUA	20	16354	1402	40	0	2006; 2008; 2010; 2013
TAKEITA	ZINDER	4	2551	278	803	1	2002; 2007; 2015
TANOUT	ZINDER	16	11944	661	116	0	2007; 2010; 2013; 2014; 2015
TASSARA	TAHOUA	4	1784	268	0	22	2005; 2007; 2009; 2011
TCHINTABARADEN	TAHOUA	5	3373	644	0	40	1999; 2009; 2010; 2011

TCHIROZERINE	AGADEZ	142	128483	4456	883	641	2001; 2003; 2006; 2007; 2009; 2010; 2011; 2013; 2015
TERA	TILLABERI	62	27923	1667	4161	199	1999; 2001; 2007; 2008; 2009; 2010; 2011; 2012; 2013
TESKER	ZINDER	2	5171	74	0	942	2007; 2010
TESSAOUA	MARADI	69	50660	2824	330	48	1999; 2001; 2002; 2003; 2005; 2006; 2010; 2013; 2014; 2015
TIBIRI (DOUTCHI)	DOSSO	120	59121	3028	3098	2	2002; 2005; 2007; 2008; 2010; 2011; 2012; 2013; 2014; 2015; 2016
TILLABERI	TILLABERI	87	43643	1166	6242	15	1999; 2002; 2003; 2007; 2008; 2010; 2011; 2012; 2015
TILLIA	TAHOUA	1	199	9	0	9	2011
TORODI	TILLABERI	46	18375	563	1082	4	1999; 2003; 2004; 2009; 2012; 2013
VILLE DE MARADI	MARADI	12	2620	290	48	1	2007; 2010
VILLE DE NIAMEY	NIAMEY	158	161497	20558	1511	128	1998; 2000; 2006; 2010; 2012; 2013; 2014; 2015
VILLE DE TAHOUA	TAHOUA	1	416	55	0	0	2013
VILLE DE ZINDER	ZINDER	55	14773	705	8	1	2002; 2006; 2007; 2009; 2010; 2015

Supplementary Table 2. Statistical parameters of significant linear models for "settlements affected at departmental level" (Model formula = Damage predictand ~ INTER (intercept) + RSUM (annual rainfall) + SUM_Q95 (extreme events rainfall) + POP (population estimates). The significance level of INTER and each independent variable was indicated by the T-test p-value level (* = P < 0.05; ** = P < 0.01; *** = P < 0.001). R2 = Coefficients of determination; SFT = significance of Fisher Test indicated by p-value level (* = P < 0.1; ** = P < 0.05; *** = P < 0.01). VIF = variance inflation factor.

DEPARTMENT	INTER	INDEPENDENT VARIABLES				R^2	SFT	VIF
		NDVI	RSUM	SUM_Q95	POP			
IFEROUANE	125.9	-1625.8	0.996*	-0.528	0.00051**	0.741	***	3.865
INGALL	197.3**	-2063**	-0.018	0.15	0.00051**	0.679	***	3.115
BOSSO	-12.6	29.8	0.053**	-0.077	0.00001	0.647	**	2.833
KOLLO	-124.4	-82.7	-0.098	0.966*	0.00015	0.644	**	2.806
BOBOYE	-87.4	159.9	-0.107	0.693*	0.00004	0.623	**	2.65
ARLIT	26	-468.5	0.317**	-0.274	0.00016*	0.616	**	2.603
GAYA	-648.9*	977.6**	0.054	0.38	0.0007**	0.606	**	2.537
AGUIE	-25.8	31.4	-0.018	0.153**	0.00006	0.605	**	2.531
TCHIROZERINE	350.6	-4507.9	-0.518*	1.25**	0.00017*	0.585	**	2.411
DOGONDOUTCHI	-86.6*	69.6	0.078	-0.001	0.00014**	0.562	**	2.283
DAKORO	-16.2**	29.4	0.008	0.03	0.00001**	0.559	**	2.269
TIBIRI (DOUTCHI)	-116.2	263.3	-0.06	0.224	0.00024**	0.546	*	2.203
MAGARIA	-80.4	293.9	-0.049	0.171	0.00004**	0.532	*	2.137
NGUIGMI	-11.3	44.8	-0.031	0.129	0.00005	0.526	*	2.11
GOUDOUMARIA	-3.3	5	0.004	0.006	0.00001	0.5	*	2.002
DIFFA	-35.8*	111.8	0.046	-0.054	0	0.5	*	1.999
KEITA	1.9	-27.2**	0	0.021*	0	0.489	*	1.956
MAINE-SOROA	-2.5	-22.2	0.05*	-0.08	0.00004*	0.486	*	1.947

Supplementary Table 3. Statistical parameters of significant linear models for "people affected at departmental level" (Model formula = Damage predictand ~ INTER (intercept) + RSUM (annual rainfall) + SUM_Q95 (extreme events rainfall) + POP (population estimates). The significance level of INTER and each independent variable was indicated by the T-test p-value level (* = P < 0.05; ** = P < 0.01; *** = P < 0.001). R2 = Coefficients of determination; SFT = significance of Fisher Test indicated by p-value level (* = P < 0.1; ** = P < 0.05; *** = P < 0.01). VIF = variance inflation factor.

DEPARTMENT	INTER	INDEPENDENT VARIABLES				R^2	STF	VIF
		NDVI	RSUM	SUM_Q95	POP			
IFEROUANE	24077.6	-326811.9*	315.286***	-240.39	0.11499**	0.829	***	5.838
BOBOYE	-29150.6	55187	-19574	136.924***	0.02826	0.691	***	3.232
BOSSO	-1212.7	-74.8	9.648**	-12111	-0.00056	0.664	**	2.973
TCHIROZERINE	436322.3	-5180358.6	-1165.723*	2382.82***	0.09864	0.63	**	2.699
GOUDOUMARIA	-550.8	-983.5	1513	1386	0.00255	0.61	**	2.566
AGUIE	-15714.1	54498.1	-17084	82.026***	0.0181	0.606	**	2.539
VILLE DE NIAMEY	-122383.4	73658.4	-62678	623917	0.08549*	0.573	*	2.32
MAINE-SOROA	-8273	-54838.6	100.747*	-54587	0.04565	0.569	**	2.312
ABALA	16591.9	-189593.5*	-18993	23852	0.12528**	0.567	**	2.233
OUALLAM	-13016.1	-106772.9	-16695	197.006**	0.05053	0.552	**	2.22
GUIDAN-ROUMDJI	-8537.5	1424.2	5344	-1929	0.01549***	0.55	*	2.22
NGUIGMI	-3197.5	20310.2	-15.627*	43.938**	0.00682	0.55	*	2.206
TIBIRI (DOUTCHI)	-67008.2	206000.5	-75385	251993	0.10196	0.547	*	2.173
DOGONDOUTCHI	-31700.7	2160.8	38124	-16519	0.06054**	0.54	*	2.036
KOLLO	166057.1	-2067618.5	274899	347281	0.26831*	0.509	*	2.34
TERA	40788.7	-300134.7*	46.77*	-93241	-0.00375	0.499	*	1.995

Supplementary Table 4. Statistical parameters of significant linear models for "houses destroyed at departmental level" (Model formula = Damage predictand ~ INTER (intercept) + RSUM (annual rainfall) + SUM_Q95 (extreme events rainfall) + POP (population estimates). The significance level of INTER and each independent variable was indicated by the T-test p-value level (* = P < 0.05; ** = P < 0.01; *** = P < 0.001). R2 = Coefficients of determination; SFT = significance of Fisher Test indicated by p-value level (* = P < 0.1; ** = P < 0.05; *** = P < 0.01). VIF = variance inflation factor.

DEPARTMENT	INTER	INDEPENDENT VARIABLES				R^2	STF	VIF
		NDVI	RSUM	SUM_Q95	POP			
IFEROUANE	798.2	-10249.4*	5.988*	-2775	0.00305**	0.778	***	0.001
BOSSO	-159.9	-233.6	1.616**	-1956	-0.00018	0.661	**	0.012
MAINE-SOROA	-257.8	-1260.9	2.799**	-2288	0.00152	0.644	**	0.016
GOTHEYE	3103.9*	-20799.8**	2.882**	-3.25	-0.00027	0.638	**	0.017
GAYA	-11791.1**	17585.5*	0.471	7878	0.01409***	0.619	**	0.022
MADAROUNFA	-1590.9	6097	-1368	6.225***	0.00035	0.611	**	0.024
TERA	2322**	-18008.1**	2.141**	-2295	-0.00032	0.61	**	0.025
BOBOYE	-644.5	-605.1	-2116	15.501**	-0.00057	0.6	**	0.028
TCHIROZERINE	22435.2	-263516.7	-50.324***	95.146***	0.00459	0.597	**	0.029
AGUIE	-1926.6	8307.1	-2263	9.604***	0.00113	0.581	**	0.035
ABALA	651.9	-9997.4*	-0.995	5.785**	0.00554**	0.575	**	0.038
OUALLAM	-1025.1	-7038.9	-0.121	11.341*	0.00327	0.57	**	0.04
NGUIGMI	-401.4	2223.9	-1512	4.615*	0.00127	0.553	**	0.048
DIFFA	-288.9	817.2	0.471	-0.939	0.00032	0.494	*	0.087

Supplementary Table 5. Statistical parameters of significant linear models for "crop losses at departmental level" (Model formula = Damage predictand ~ INTER (intercept) + RSUM (annual rainfall) + SUM_Q95 (extreme events rainfall) + POP (population estimates). The significance level of INTER and each independent variable was indicated by the T-test p-value level (* = P < 0.05; ** = P < 0.01; *** = P < 0.001). R2 = Coefficients of determination; SFT = significance of Fisher Test indicated by p-value level (* = P < 0.1; ** = P < 0.05; *** = P < 0.01). VIF = variance inflation factor.

DEPARTMENT	INTER	INDEPENDENT VARIABLES				R^2	STF	VIF
		NDVI	RSUM	SUM_Q95	POP			
IFEROUANE	167077.1	-2145539.5*	1253.86*	-582.03	0.63843**	0.778	***	4.498
VILLE DE NIAMEY	1155.6	-10071**	1256	1704	0.0003	0.705	***	3.367
GOTHEYE	4767.7***	-27694.9***	3.119***	-5.032*	-0.00173	0.703	***	3.247
MAGARIA	-599.5	1570.5	-0.834**	3.019**	0.0007***	0.692	***	3.392
GAYA	-28767.1***	43705.5**	2274	14182	0.03315***	0.61	**	2.567
AGUIE	204.1*	-2018.8***	0.307***	0.189	0.00028*	0.61	**	2.562
BOSSO	-45.2	163.5	0.104*	-0.185	0.00006	0.554	**	2.242
MAINE-SOROA	-166.4	-1254.7	2074	-0.741	0.00091	0.539	*	2.169

Supplementary Table 6. Statistical parameters of significant linear models for "livestock losses at departmental level" (Model formula = Damage predictand ~ INTER (intercept) + RSUM (annual rainfall) + SUM_Q95 (extreme events rainfall) + POP (population estimates). The significance level of INTER and each independent variable was indicated by the T-test p-value level (* = P < 0.05; ** = P < 0.01; *** = P < 0.001). R2 = Coefficients of determination; SFT = significance of Fisher Test indicated by p-value level (* = P < 0.1; ** = P < 0.05; *** = P < 0.01). VIF = variance inflation factor.

DEPARTMENT	INTER	INDEPENDENT VARIABLES				R^2	STF	VIF
		NDVI	RSUM	SUM_Q95	POP			
IFEROUANE	4386.6	-56257.9	30642	-7606	0.01602*	0.712	***	3.475
VILLE DE ZINDER	5.4*	-26.4	0.001	-0.009	0	0.572	**	2.336
ARLIT	-126.5	-334	6.279**	-8.73**	0.00111	0.506	*	2.025
GUIDAN-ROUMDJI	-88.7*	436.1*	-0.087*	0.27**	0.00002	0.498	*	1.994
TCHIROZERINE	2972.8	-39983.6	1227	-1609	0.00192**	0.488	*	1.954