

Annex

Tables:

Table S1 : Anaemia severity thresholds (blood haemoglobin concentration).

Population age groups and status	Non-anaemic (g/l)	Low severity (g/l)	Moderate severity (g/l)	High severity (g/l)
5–11yrs	≥115	110–114	80–109	<80
12–14yrs	≥120	110–119	80–109	<80
Non-pregnant women aged ≥15yrs	≥120	110–119	80–109	<80
Pregnant women aged ≥15yrs	≥110	100–109	70–99	<70
Men aged ≥15yrs	≥130	110–129	80–109	<80

Classification is according to the World Health Organization guidelines [33].

Table S2: Results of semivariogram parameters for the prevalence of anaemia, and the prevalence of anaemia severity in Burundi per year, 2008–2011.

Year	Raw anaemia	Anaemia residuals	Low severity	Moderate/high severity
2008				
Spatial autocorrelation	None	Trended	Clustered	Clustered
Nugget	0.0712379	0.00469545	0	0
Sill	0	0.008014904	0.008307482	0.01295277
Range	1.180104	0.9034204	0.5694854	0.3049023
2009				
Spatial autocorrelation	Trended	Trended	Trended	Trended
Nugget	0.015418361	0.001782568	0.001611758	0
Sill	0.002902369	0.010901082	0.004095228	0.006998316
Range	0.9312157	1.198152	1.798028	0.8986704
2010				
Spatial autocorrelation	Trended	Trended	Clustered	Trended
Nugget	0	0.01044786	0	0.01955982
Sill	0.1884992	0.18751196	0.02849971	0.07767505
Range	0.8221483	0.9977894	0.2618964	1.135447
2011				
Spatial autocorrelation	None	Trended	Trended	Trended
Nugget	0.02082441	0	0	0

Sill	0	0.009436121	0.005866115	0.00221214
Range	0.96954	1.198615	1.797464	0.8987203

Table S3: Estimated number of anaemic school-aged children per district in Burundi, 2008–2011.

District	Number of anaemic school-aged children			
	2008	2009	2010	2011
Bubanza	8,504	5,051	8,922	4,005
Buhiga	14,101	9,478	15,893	7,734
Bururi	5,463	3,239	6,235	2,408
Busoni	9,064	6,152	9,492	5,215
Butezi	8,963	6,181	9,520	4,573
Buye	10,549	7,054	11,072	5,487
Cankuzo	6,562	4,584	6,786	3,764
Cibitoke	8,885	5,056	8,284	3,833
Fota	9,287	6,362	11,182	5,409
Gahombo	9,068	5,892	9,977	4,521
Gashoho	8,902	6,350	9,335	5,235
Gihofi	7,927	5,265	8,203	3,911
Gitega	14,474	10,046	16,612	7,811
Giteranyi	12,955	9,016	13,510	7,492
Isale	15,231	9,206	15,374	7,065
Kabezi	9,441	6,101	10,000	5,128
Kayanza	13,638	8,346	15,979	7,032
Kibumbu	9,603	6,707	11,582	5,509
Kibuye	13,285	8,900	15,350	6,821
Kiganda	8,704	5,726	10,219	4,523
Kinyinya	9,294	6,674	9,254	5,084
Kiremba	15,455	10,604	16,186	8,545
Kirundo	10,846	7,411	11,095	6,089
Mabayi	10,736	6,145	11,247	4,767
Makamba	12,279	8,112	12,793	6,273
Matana	11,268	7,372	13,948	6,075
Mpanda	7,364	4,407	7,405	3,331
Mukenke	7,859	5,513	8,079	4,637
Muramvya	7,411	4,642	8,963	3,889
Murore	6,219	4,450	6,526	3,969
Musema	13,372	8,450	15,509	6,577
Mutaho	10,986	7,202	12,633	5,392
Muyinga	15,034	10,794	15,814	8,695
Ngozi	14,474	9,535	15,781	7,491
Nyabikere	12,174	7,982	13,903	6,059
Nyanza-Lac	9,212	5,890	9,157	4,622
Rumonge	11,755	7,489	12,096	5,730
Rutana	8,994	5,953	9,723	4,330

Ruyigi	5,979	4,185	6,276	3,244
Rwibaga	8,121	5,473	9,599	5,022
Ryansoro	7,475	4,934	9,265	3,980
Vumbi	10,749	7,486	10,758	5,967
ZONE-Centre	2,115	1,233	1,964	890
ZONE-Nord	6,742	3,856	6,176	2,839
ZONE-Sud	3,135	1,865	2,927	1,335
Total	443,657	292,370	480,605	232,304

Table S4: Estimated number of school-aged children with low- and moderate/high-severity anaemia per district in Burundi, 2008–2011.

	Low-severity anaemia				Moderate/high-severity anaemia			
District	2008	2009	2010	2011	2008	2009	2010	2011
Bubanza	4,915	2,815	2,485	3,984	2,082	3,639	4,323	2,177
Buhiga	4,882	5,774	8,525	10,009	4,308	3,359	2,993	1,156
Bururi	3,299	1,799	127	54	1,476	2,079	1,912	710
Busoni	6,402	3,891	2,483	8,516	3,529	5,695	6,421	4,578
Butezi	2,351	5,724	781	565	4,812	1,444	1,445	550
Buye	3,473	8,655	6,743	7,586	7,523	1,940	1,224	447
Cankuzo	3,348	2,246	1,573	1,106	1,725	2,836	3,029	1,335
Cibitoke	2,862	5,149	2,633	7,600	4,394	2,198	3,467	1,427
Fota	7,066	2,268	2,641	2,251	1,678	4,598	2,727	1,061
Gahombo	2,494	6,930	4,757	4,252	5,748	1,160	536	144
Gashoho	4,341	3,989	5,420	8,626	3,235	3,335	3,186	1,482
Gihofi	2,950	4,253	3,092	2,466	3,579	1,944	2,475	1,014
Gitega	6,170	7,951	2,117	1,429	6,112	2,959	912	239
Giteranyi	7,837	4,964	3,284	7,176	4,235	6,610	7,743	4,968
Isale	7,041	6,201	9,960	10,284	5,334	4,978	5,945	2,555
Kabezi	6,619	2,017	6,299	5,605	1,628	5,018	5,584	2,816
Kayanza	13,000	5,231	8,027	9,488	4,138	9,331	6,679	3,764
Kibumbu	5,419	4,248	2,581	1,647	3,201	2,803	967	236
Kibuye	6,406	5,984	3,546	2,840	4,776	3,258	1,997	645
Kiganda	3,974	5,682	4,183	3,218	4,651	2,358	1,205	436
Kinyinya	2,296	3,251	774	454	2,678	1,800	2,987	1,256
Kiremba	5,423	11,544	13,071	17,721	10,028	3,806	3,411	1,536
Kirundo	6,643	5,588	2,906	13,373	5,126	5,802	6,419	4,136
Mabayi	7,786	6,489	4,884	8,937	5,884	6,324	6,730	3,954
Makamba	6,139	6,174	6,726	5,112	5,322	4,220	4,426	2,016
Matana	8,174	2,978	1,474	1,649	2,188	5,202	2,739	978
Mpanda	3,002	3,709	2,151	3,101	2,988	2,147	2,640	1,070
Mukenke	4,362	3,348	2,864	7,144	2,934	3,662	4,476	2,835
Muramvya	6,255	2,211	3,756	3,326	1,704	4,363	3,494	1,674
Murore	4,126	1,803	3,785	2,924	1,464	3,691	4,376	2,480
Musema	6,025	9,104	6,640	5,686	7,393	3,433	1,921	695
Mutaho	2,397	8,761	3,400	2,556	6,988	1,199	580	151
Muyinga	7,558	5,065	2,859	3,389	3,759	6,108	6,111	2,726
Ngozi	4,267	8,708	8,189	8,517	7,156	1,999	1,185	348
Nyabikere	2,658	7,203	2,970	2,973	5,521	1,538	1,127	376
Nyanza-Lac	4,060	2,106	651	211	1,727	2,464	3,512	1,318
Rumonge	6,078	6,111	689	414	5,071	4,296	3,582	1,352
Rutana	4,866	3,124	2,361	1,916	2,604	2,777	3,097	1,317
Ruyigi	1,942	2,267	594	311	1,836	1,410	1,793	759

Rwibaga	9,308	513	7,389	7,316	382	7,753	7,474	4,414
Ryansoro	4,089	3,478	2,149	1,498	2,709	2,160	1,030	336
Vumbi	4,199	7,730	5,563	13,072	7,039	3,341	3,684	1,939
Zone-Centre	555	1,070	1,014	1,111	954	373	586	186
Zone-Nord	1,805	2,847	3,855	4,579	2,596	1,167	2,059	629
Zone-Sud	765	1,043	782	820	848	511	813	231
Total	219,628	211,995	172,755	216,813	175,066	153,086	145,020	70,453

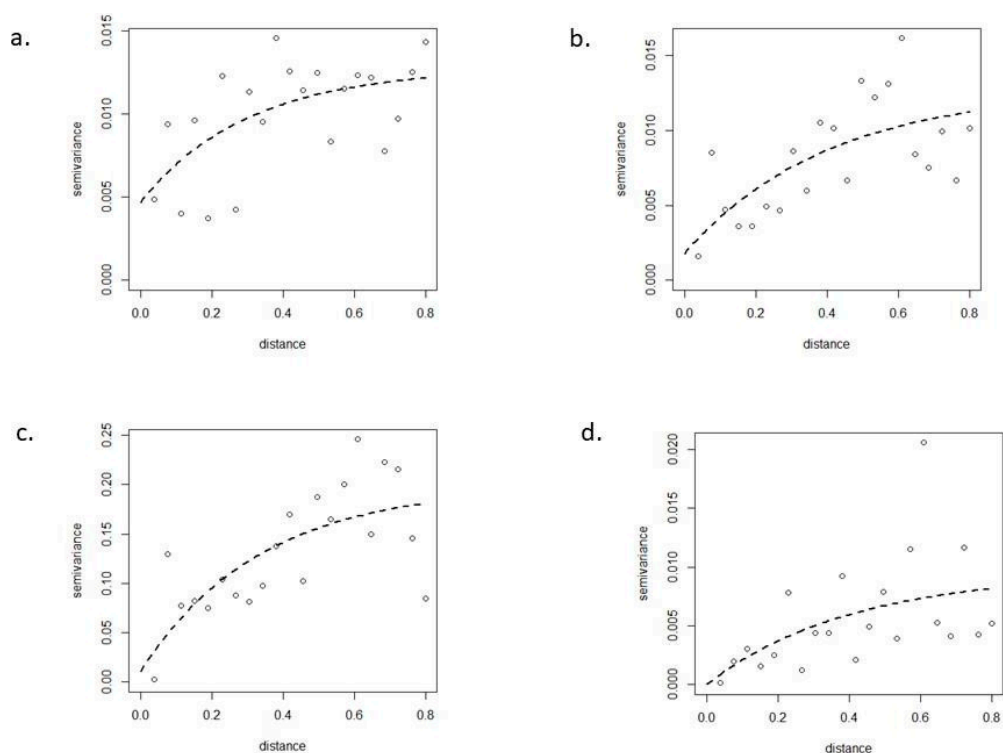
Table S5: Values of the validation metrics used for the predictive maps of the prevalence of anaemia and of anaemia severity classes in school-aged children in Burundi, 2008–2011.

Prevalence of anaemia	Mean prediction error	Absolute prediction error
2008	-0.003	0.222
2009	-0.005	0.112
2010	-0.164	0.184
2011	0.027	0.104
Prevalence of low-severity anaemia		
2008	0.063	0.232
2009	0.074	0.120
2010	0.086	0.146
2011	0.052	0.220
Prevalence of moderate/high-severity anaemia		
2008	0.122	0.142
2009	-0.009	0.107
2010	0.006	0.111
2011	0.021	0.046

Figures:

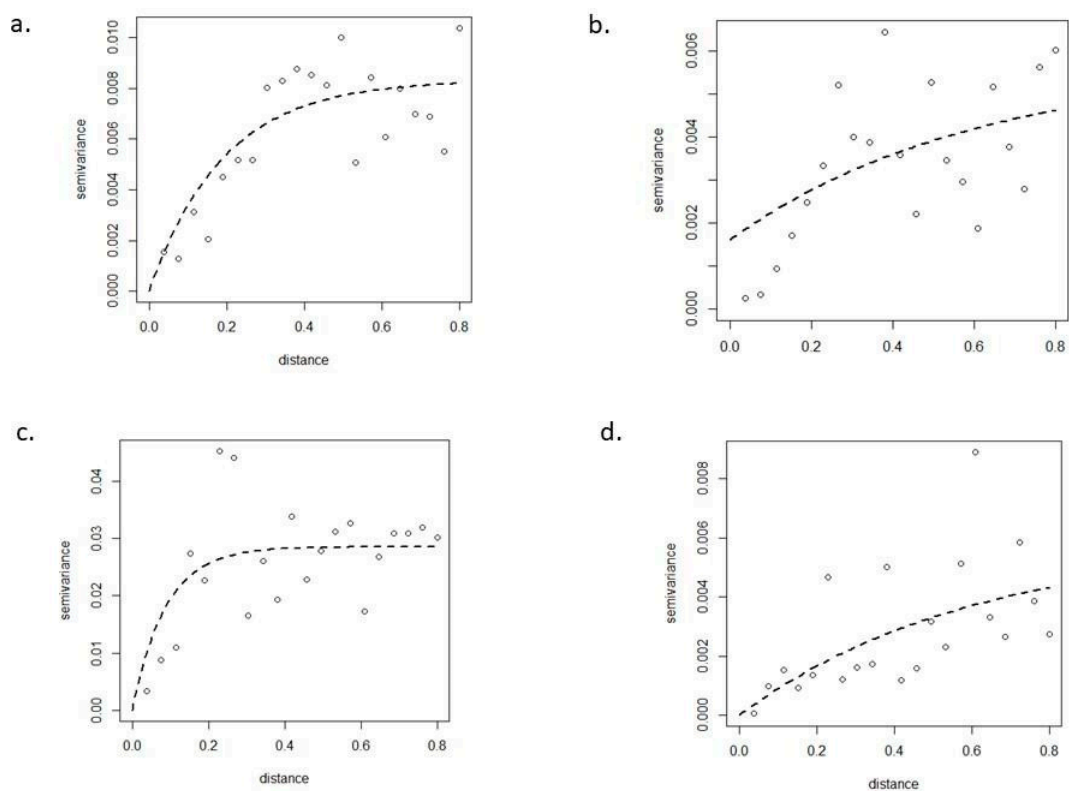
Semivariograms and maps for the standard deviation of the prevalence of anaemia and of anaemia severity in school-aged children in Burundi, 2008–2011, and tables with the predicted number of school-aged children with anaemia or in anaemia severity classes.

Figure S1: Semivariograms for the prevalence of anaemia in Burundi, 2008–2011



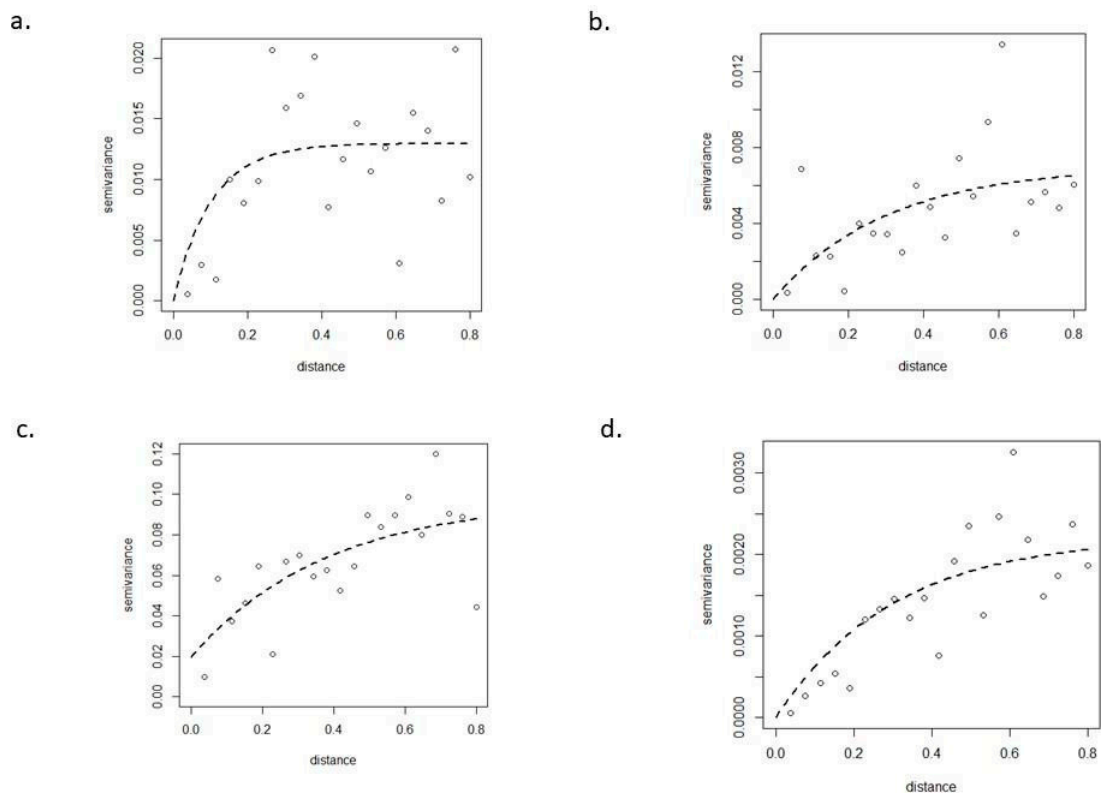
The y-axis represents the semivariance and the x-axis the distance (in decimal degrees). **(a)** 2008, **(b)** 2009, **(c)** 2010, **(d)** 2011.

Figure S2: Semivariograms for the prevalence of low-severity anaemia in Burundi, 2008–2011.



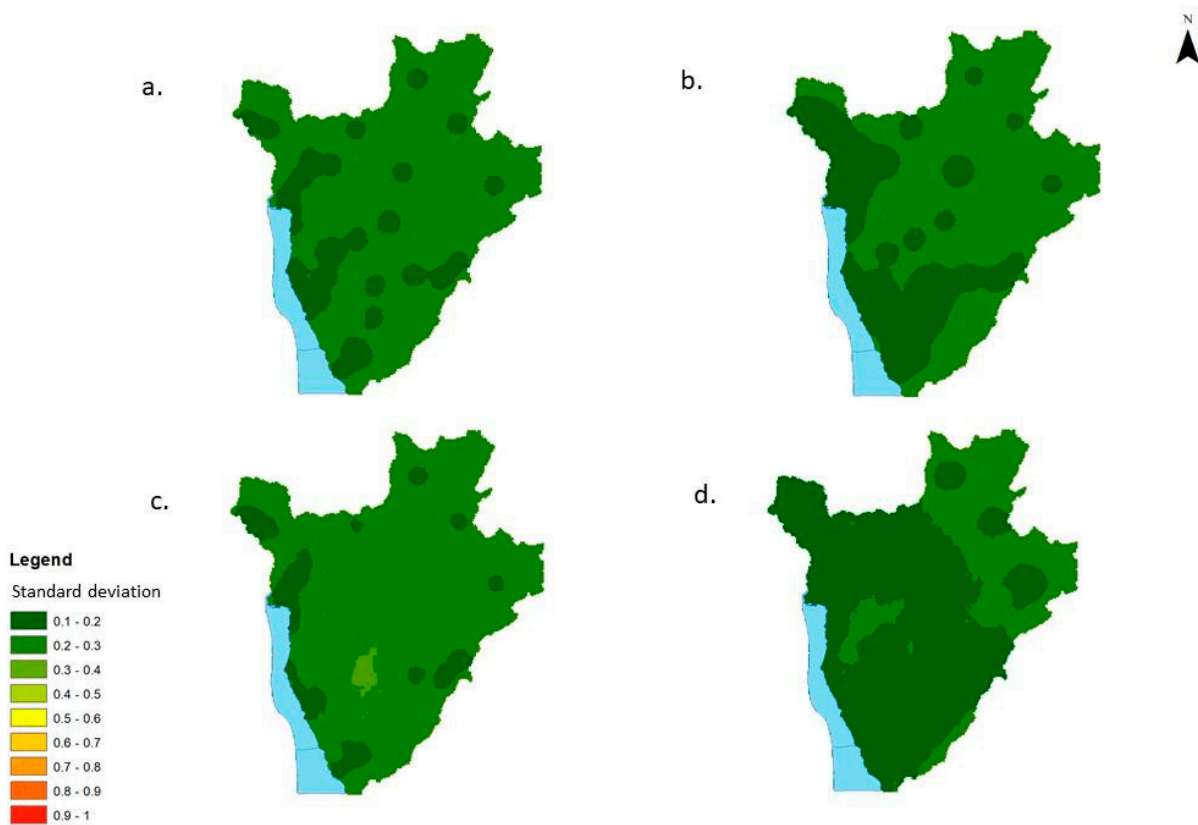
The y-axis represents the semivariance and the x-axis the distance (in decimal degrees). **(a)** 2008, **(b)** 2009, **(c)** 2010, **(d)** 2011.

Figure S3: Semivariograms for the prevalence of moderate/high-severity anaemia in Burundi, 2008–2011.



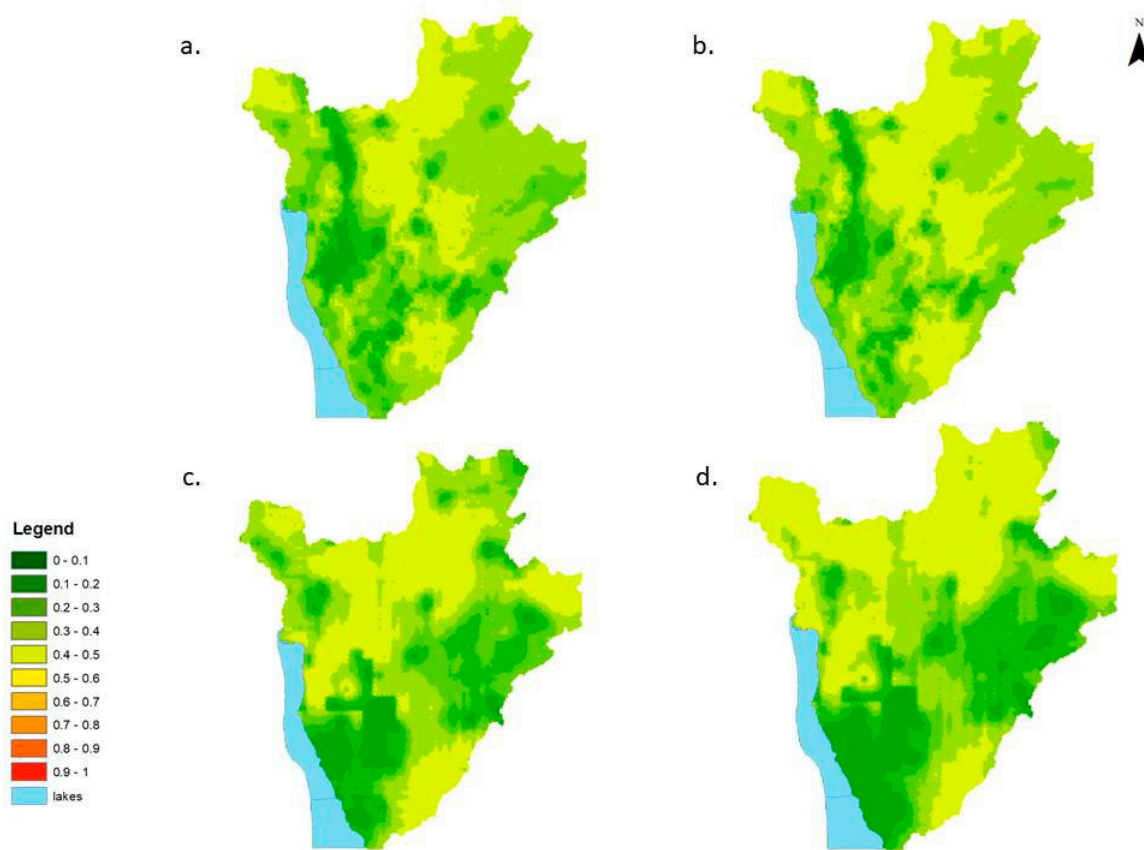
The y-axis represents the semivariance and the x-axis the distance (in decimal degrees). **(a)** 2008, **(b)** 2009, **(c)** 2010, **(d)** 2011.

Figure S4: Standard deviation maps of anaemia prevalence per year in Burundi, 2008–2011.



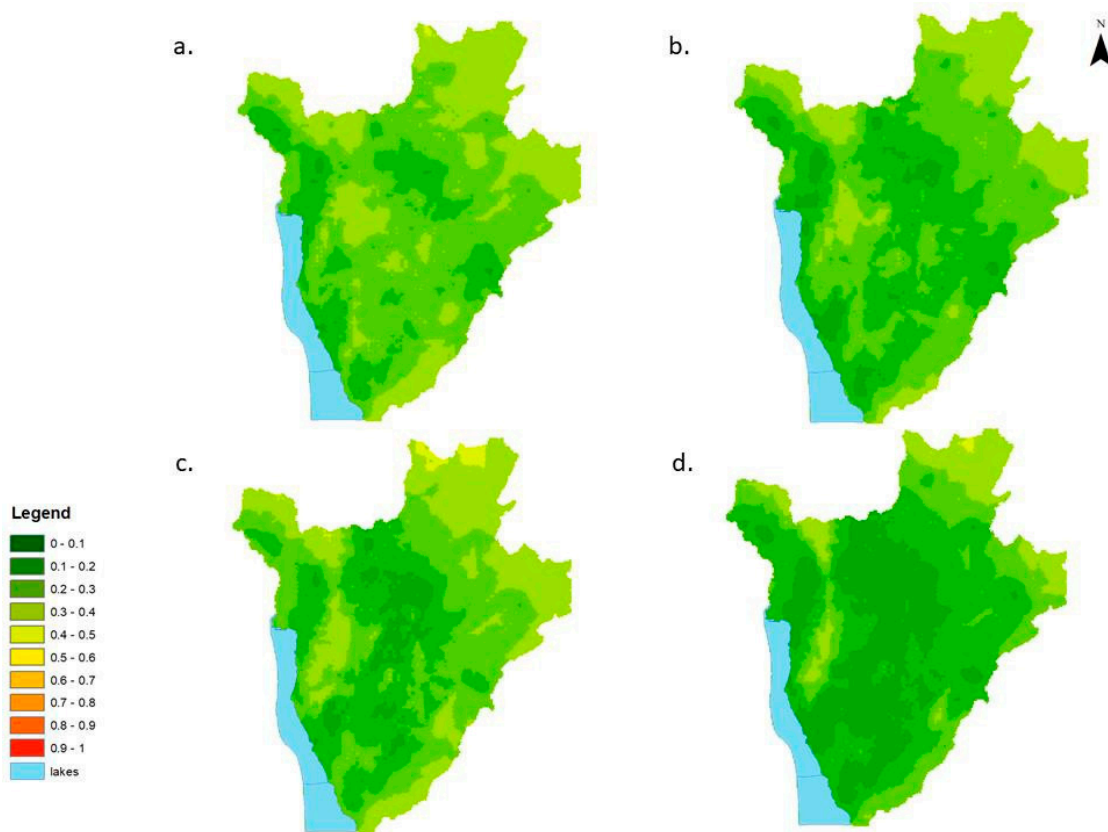
The intensity of the colour represents the magnitude of the standard deviation (see accompanying legend) for the proportion of school-aged children with anaemia (see Table 1 of main text for classification of anaemia according to the World Health Organization [1]). The pale blue colour depicts the location Lake Tanganyika. **(a)** 2008, **(b)** 2009, **(c)** 2010, **(d)** 2011.

Figure S5: Standard deviation maps for the prevalence of low-severity anaemia per year in Burundi, 2008–2011.



The intensity of the colour represents the magnitude of the standard deviation (see accompanying legend) for the proportion of school-aged children with low-severity anaemia (see Table 1 of main text for classification of anaemia and anaemia severity categories according to the World Health Organization [1]). The pale blue colour depicts the location of Lake Tanganyika. **(a)** 2008, **(b)** 2009, **(c)** 2010, **(d)** 2011.

Figure S6: Standard deviation maps for the prevalence of moderate/high-severity anaemia per year in Burundi, 2008–2011.



The intensity of the colour represents the magnitude of the standard deviation (see accompanying legend) for the proportion of school-aged children with moderate- and high-severity anaemia (see Table 1 of main text for classification of anaemia and anaemia severity categories according to the World Health Organization [1]). The pale blue colour depicts the location of Lake Tanganyika. **(a)** 2008, **(b)** 2009, **(c)** 2010, **(d)** 2011.

Annex Reference

1. World Health Organization. Iron deficiency anaemia: assessment, prevention and control. A guide for programme managers. 2001; WHO/NHD/01.3. Available: <http://www.who.int/vmnis/indicators/haemoglobin.pdf> (accessed 30 May 2018).