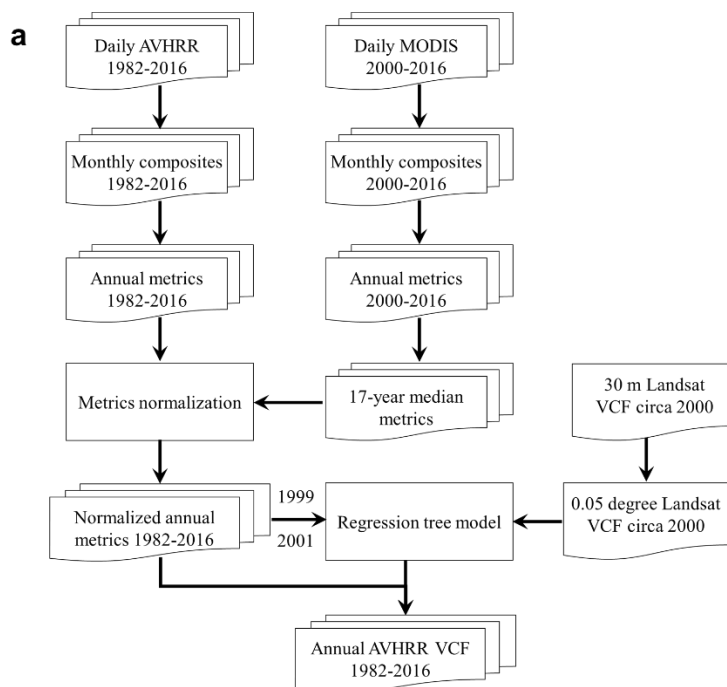


904 **Supplementary Information Figure 1.** Method of generating the annual AVHRR vegetation  
 905 continuous fields (VCF) land-cover product. **a**, Flowchart. **b**, Annual metrics derived from  
 906 monthly composites.



**b**

Metric type	Statistical transformation	N
Individual band- or index-based metrics	Percentile (0, 10, 25, 50, 75, 90 and 100) values of channels 1-5 and NDVI.	42
	Mean and standard derivation of all observations between any two percentiles of channels 1-5 and NDVI.	252
Interaction metrics of two bands or indices	Channels 1-5 corresponding to percentiles of NDVI.	35
	Channels 1-3 and NDVI corresponding to percentiles of channel 4 brightness temperature.	28
	Mean and standard derivation of all observations of channels 1-5 between any two percentiles of NDVI.	210
	Mean and standard derivation of all observations of channels 1-3 and NDVI between any two percentiles of channel 4 brightness temperature.	168

907

908

909 **Supplementary Information Table 1.** Estimates of 1982 land cover area, 1982-2016 annual net  
 910 land-cover change and 1982-2016 gross land-cover change at national scale. Consistent with  
 911 Extended Data Tables 1 and 2, annual net land-cover change (slope) and 1982 land-cover area  
 912 were estimated using Theil-Sen regression of time series of annual land-cover area per country.  
 913 Lower and upper slopes represent the 90% confidence interval. Reported p-value is for the  
 914 Mann-Kendall test for trend. Gross land-cover change was estimated based on per-pixel non-

915 parametric trend analysis. Per-pixel loss and gain were summed to derive gross loss and gain at  
 916 the aggregated scale. Country boundary shapefile was downloaded from Global Administrative  
 917 Areas (GADM) (<http://www.gadm.org>). Only countries with land area greater than 10<sup>5</sup> km<sup>2</sup> are  
 918 included.

Country	Tree canopy cover						Short vegetation cover						Bare ground cover											
	Annual net change						Gross change						Annual net change						Gross change					
	Area (B2)	Slope (B2)	Lower (B2)	Upper (B2)	p	Loss (B2)	Gain (B2)	Area (B2)	Slope (B2)	Lower (B2)	Upper (B2)	p	Loss (B2)	Gain (B2)	Area (B2)	Slope (B2)	Lower (B2)	Upper (B2)	p	Loss (B2)	Gain (B2)			
																						(B2/km <sup>2</sup> )	(B2/km <sup>2</sup> )	(B2/km <sup>2</sup> )
Afghanistan	2	0.0	0.0	0.0	0.000	-1	0	289	-1.1	-1.6	-0.6	0.000	-34	4	451	1.2	0.6	1.7	0.000	-4	35			
Algeria	8	0.0	0.0	0.1	0.023	0	2	850	0.0	-0.4	0.5	0.930	-6	7	2566	-0.1	-0.6	0.3	0.755	-7	5			
Angola	390	-1.1	-2.1	-0.2	0.044	-34	8	776	1.3	0.4	2.3	0.023	-5	34	84	-0.1	-0.4	0.2	0.733	-5	3			
Argentina	456	-3.3	-5.5	-1.2	0.011	-84	8	1545	0.9	-0.4	2.4	0.233	-51	87	732	2.7	0.6	5.1	0.029	-9	61			
Australia	459	-0.6	-2.2	0.7	0.532	-38	29	4452	-4.1	-0.7	4.1	0.379	-0.6	48	2764	5.2	-4.0	2.5	0.280	-34	10			
Bangladesh	39	0.2	0.1	0.3	0.000	0	6	301	0.1	0.0	0.1	0.088	-2	3	20	-0.3	-0.3	-0.2	0.000	-8	1			
Belarus	60	1.1	0.8	1.3	0.000	0	32	30	-1.0	-1.3	-0.8	0.000	-30	0	5	-0.1	-0.1	-0.1	0.000	-1	0			
Benin	12	0.1	0.0	0.2	0.008	0	3	94	-0.1	-0.1	0.0	0.005	-2	0	9	0.0	0.0	0.0	0.478	-1	0			
Bolivia	587	-1.3	-1.9	-0.7	0.001	-43	8	348	1.5	0.9	2.1	0.000	-10	47	166	-0.1	-0.3	0.2	0.570	-7	4			
Botswana	23	0.0	-0.1	0.1	0.650	-1	2	390	0.6	-0.3	1.7	0.307	-1	8	176	-0.6	-1.7	0.5	0.334	-9	1			
Brazil	4856	-1.3	-6.0	-8.1	0.000	-399	70	3400	1.6	7.6	16.1	0.000	-63	395	212	0.1	-0.4	0.7	0.712	-9	28			
Bulgaria	26	0.5	0.4	0.6	0.000	0	13	79	-0.4	-0.5	-0.3	0.000	-11	0	6	-0.1	-0.1	-0.1	0.000	-2	0			
Burkina Faso	5	0.0	0.0	0.1	0.061	0	1	86	0.3	0.0	0.5	0.201	-1	10	85	-0.3	-0.6	0.0	0.083	-11	1			
Cambodia	74	-0.2	-0.4	0.0	0.140	-2	10	94	0.2	0.0	0.4	0.125	-9	2	8	0.0	0.0	0.0	0.755	-1	0			
Cameroon	222	0.7	0.4	0.9	0.000	-8	2	226	-0.5	-0.8	-0.2	0.008	-2	8	38	-0.1	-0.2	-0.1	0.000	-2	1			
Canada	3025	2.1	-2.7	6.6	0.478	-1	8	5544	1.3	-3.7	-6.6	0.550	-3	120	-3.5	-4.5	2.8	0.000	-3	0				
Central African Republic	234	1.7	1.2	2.1	0.000	-122	57	379	-1.5	-1.9	-1.1	0.000	-122	53	11	-0.1	-0.2	-0.1	0.000	-72	10			
Chad	22	0.3	0.2	0.4	0.000	0	48	372	1.2	0.6	1.8	0.002	-4	0	880	-1.5	-2.2	-0.8	0.002	-2	0			
Chile	258	0.6	0.4	0.8	0.000	0	8	311	-0.8	-1.2	-0.4	0.002	-5	39	297	0.3	-0.1	0.6	0.347	-42	1			
China	3779	10.7	7.8	12.2	0.000	-5	23	4613	-3.1	-5.1	-1.2	0.006	-30	9	3625	-7.3	-9.5	-5.1	0.000	-8	3			
Colombia	707	10	0.5	15	0.002	-16	324	393	-0.8	-1.2	-0.4	0.005	-330	224	45	-0.2	-0.3	-0.2	0.000	-286	78			
Côte d'Ivoire	300	0.3	0.1	0.5	0.011	-5	33	209	-0.3	-0.5	-0.1	0.025	-29	7	13	0.0	-0.1	0.0	0.340	-5	1			
Cuba	24	0.5	0.5	0.6	0.000	0	8	80	-0.5	-0.5	-0.4	0.000	-16	0	4	-0.1	-0.1	-0.1	0.000	-1	0			
Democratic Republic of the Congo	1580	-1.8	-3.2	-0.1	0.074	-52	20	706	1.7	0.1	3.2	0.078	-9	50	29	0.0	0.0	0.1	0.430	0	2			
Ecuador	250	0.1	0.0	0.2	0.050	-1	3	94	-0.1	-0.2	0.1	0.334	-2	1	34	-0.1	-0.1	0.0	0.122	-5	0			
Egypt	3	0.0	0.0	0.0	0.008	0	1	51	0.3	0.2	0.5	0.000	-4	0	928	-0.3	-0.5	-0.2	0.000	-16	3			
Eritrea	0	0.0	0.0	0.0	0.551	0	0	33	0.1	0.0	0.2	0.364	-2	4	86	-0.1	-0.2	0.0	0.173	-4	2			
Ethiopia	134	0.2	-0.1	0.4	0.307	-6	10	708	-0.2	-0.7	0.5	0.712	-18	16	308	0.0	-0.6	0.8	0.977	-12	12			
Finland	953	0.8	0.5	1.1	0.000	-1	21	359	-0.8	-1.0	-0.5	0.000	-18	0	7	-0.1	-0.1	0.0	0.000	-1	0			
France	254	10	0.3	15	0.028	-3	25	377	-0.9	-1.4	-0.3	0.025	-23	4	17	-0.1	-0.2	0.0	0.044	-2	0			
Gabon	203	0.0	-0.1	0.1	1.000	-2	3	58	0.0	-0.1	0.1	0.691	-3	2	5	0.0	0.0	0.1	0.011	0	1			
Germany	303	1.1	0.7	1.6	0.000	0	29	244	-1.1	-1.4	-0.6	0.001	-26	0	9	-0.1	-0.1	-0.1	0.001	-1	0			
Ghana	55	0.1	0.0	0.2	0.201	-2	5	83	-0.1	-0.2	0.1	0.334	-5	2	17	0.0	-0.1	0.0	0.733	-1	1			
Greece	18	0.4	0.3	0.5	0.000	0	11	95	-0.2	-0.3	-0.1	0.000	-7	2	15	-0.2	-0.2	-0.2	0.000	-5	0			
Guatemala	60	0.0	0.0	0.1	0.334	-6	8	45	0.0	-0.1	0.1	0.670	-7	6	2	0.0	0.0	0.0	0.000	-1	0			
Guinea	53	0.4	0.3	0.5	0.000	0	14	82	-0.3	-0.4	-0.2	0.000	-9	1	11	-0.1	-0.2	-0.1	0.000	-3	0			
Guyana	172	0.2	0.1	0.3	0.000	0	5	36	-0.2	-0.3	-0.1	0.000	-5	0	3	0.0	0.0	0.0	0.798	0	0			
Honduras	62	0.2	0.1	0.3	0.003	-2	8	50	-0.2	-0.2	-0.1	0.006	-7	2	2	0.0	0.0	0.0	0.000	0	0			
Iceland	5	0.0	0.1	0.1	0.011	0	1	24	0.0	0.0	0.0	0.426	-1	1	23	0.0	-0.1	0.0	0.244	-1	0			
India	280	2.2	1.8	2.6	0.000	-4	56	2072	5.7	4.1	6.9	0.000	-34	99	802	-7.9	-9.5	-6.1	0.000	-128	5			
Indonesia	1295	2.0	0.0	4.0	0.105	-25	68	547	-1.8	-3.7	0.1	0.112	-62	24	39	-0.2	-0.3	-0.1	0.027	-5	3			
Iran	34	0.1	0.0	0.1	0.005	0	3	350	-0.9	-1.8	0.0	0.099	-34	22	1251	0.8	0.0	1.7	0.094	-22	32			
Iraq	1	0.0	0.0	0.0	0.000	0	0	79	-0.7	-0.7	0.2	0.511	-13	6	7	-0.2	-0.2	-0.2	0.000	-6	0			
Italy	64	0.8	0.6	1.0	0.000	-1	22	213	-0.6	-0.8	-0.4	0.000	-18	2	19	-0.2	-0.2	-0.1	0.000	-5	1			
Japan	367	1.5	1.1	1.9	0.000	-1	45	280	-1.4	-1.8	-1.1	0.000	-43	1	11	-0.1	-0.1	0.0	0.001	-2	1			
Kazakhstan	49	0.1	-0.1	0.4	0.379	-2	7	1472	-1.7	-4.3	0.4	0.256	-60	33	1156	-1.7	-4.2	0.8	0.280	-35	59			
Kenya	38	0.1	-0.1	0.2	0.307	-2	5	357	-0.3	-1.0	0.3	0.534	-12	6	19	0.3	-0.5	1.0	0.495	-6	9			
Kyrgyzstan	6	0.0	0.0	0.1	0.712	0	1	27	0.2	0.1	0.3	0.000	-1	7	59	-0.2	-0.4	-0.1	0.000	-7	1			
Laos	14	0.4	0.2	0.7	0.001	-2	15	85	-0.4	-0.7	-0.2	0.001	-15	2	3	0.0	0.0	0.0	0.650	0	0			
Libya	2	0.0	0.0	0.0	0.712	0	0	29	0.0	-0.2	0.1	0.650	-2	2	1588	0.0	-0.1	0.2	0.650	-2	2			
Madagascar	155	-0.7	-1.0	-0.4	0.000	-20	2	387	0.5	0.2	0.8	0.003	-4	16	49	0.3	0.1	0.5	0.012	-1	9			
Malawi	22	-0.1	-0.2	-0.1	0.002	-4	0	70	0.1	0.1	0.2	0.001	-6	3	5	0.0	0.0	0.1	0.021	0	1			
Malaysia	243	0.6	0.2	1.0	0.000	0	8	85	0.6	-1.0	-0.2	0.000	-6	3	5	0.0	0.0	0.0	0.268	0	0			
Mali	30	0.2	0.1	0.2	0.000	0	5	306	1.1	0.4	1.8	0.036	-2	41	936	-1.3	-2.0	-0.6	0.016	-43	1			
Mauritania	1	0.0	0.0	0.0	0.776	0	0	52	1.0	0.5	1.4	0.003	0	31	993	-1.0	-1.4	-0.5	0.003	-31	0			
Mexico	362	1.9	0.9	2.7	0.003	-9	63	185	-1.9	-2.8	-0.8	0.003	-73	25	396	0.2	-1.3	1.8	0.691	-28	26			
Mongolia	49	-0.2	-0.3	-0.1	0.005	-7	2	684	-1.4	-2.6	-0.6	0.053	-43	12	17	-0.7	-0.7	-0.7	0.020	-9	17			
Morocco	4	0.0	0.0	0.0	0.551	0	1	85	0.2	0.3	0.6	0.379	-3	7	270	-0.2	-0.6	0.2	0.384	-7	3			