SUPPLEMENTARY INFORMATION

Mapping land-use fluxes for 2001-2020 from global models to national inventories

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Acronyms:

BM: Bookkeeping models

DGVM: Dynamic Global Vegetation Models

NGHGI: National GHG inventories

Supplementary table 1. Key data on forest area and LULUCF fluxes for the 42 countries having a non-intact (managed) forest area greater than 10 Million ha in both our study and NGHGIs. The data includes the area of non-intact (managed) forest and the CO_2 fluxes (Mt CO_2 yr^{-1}, 2001-2020 average) from bookkeeping models (BMs), Dynamic Global Vegetation Models (DGVMs), and National GHG inventories (NGHGIs) for LULUCF, forest land (including harvested wood products and excluding organic soils), deforestation, and other fluxes (organic soils, cropland, grassland etc.). The countries listed represent nearly 90% of the global area of non-intact (managed) forest. BM values are averages of three models and DGVM values are averages of 17 models, consistent with the Global Carbon Budget 2021 (Friedlingstein et al. 2022). Values for NGHGIs are from Grassi et al. (2022).

	Areas of managed forest (Mha, around 2015)		C fluxes (Mt CO2 yr-1, average 2001-2020)										
			LULUCF			FOREST				DEFORESTATION		Org. soils, cropland grassland etc	
	Used in this study (1)	Based on country data (2)	BMs	BMs + DGVMs	NGHGIs	BMs	DGVMs	BMs + DGVMs	NGHGIs	BMs	NGHGIs	BMs	NGHGIs
Angola	71	53	94	-40	55	-13	-134	-147	3	99	53	8	0
Argentina	37	49	142	120	73	3	-22	-19	-11	96	78	42	5
Australia (3)	44	133	33	20	15	-7	-13	-20	-44	33	61	7	-2
Bolivia	46	53	70	-3	38	-14	-72	-87	15	78	25	6	-1
Brazil	338	338	737	274	729	-142	-462	-605	-361	837	1084	42	7
Cameroon	34	20	23	-47	-77	-7	-71	-78	-87	28	0	3	10
Canada	283	283	116	-261	-7	39	-377	-338	-4	54	7	23	-11
Central African Republic	55	20	6	-85	-229	-1	-92	-93	-333	8	104	-1	0
Chile	12	18	18	4	-67	12	-14	-2	-71	10	3	-3	1
China	173	214	155	-130	-950	-175	-285	-460	-796	226	0	103	-155
Colombia	45	28	52	-47	73	-79	-99	-178	-21	129	93	2	0
Congo	20	24	14	-40	-18	-2	-54	-56	-24	15	6	2	0
Cote d'Ivoire	20	3	77	44	27	-19	-33	-52	-14	92	41	4	0
Dem. Rep Congo	154	152	413	80	567	-89	-333	-422	0	494	567	8	0
Ethiopia	19	17	86	56	61	-9	-29	-38	-87	41	0	54	148
Finland	20	22	12	-20	-22	5	-33	-27	-40	3	3	4	15
France	17	24	-31	-50	-40	-23	-19	-42	-61	-15	11	7	9
Gabon	19	18	8	-33	-110	-2	-41	-43	-118	9	8	0	0
Germany	13	11	-42	-62	-15	-34	-20	-54	-61	-16	1	9	45
India	38	71	68	15	-259	-96	-52	-149	-72	122	0	42	-187
Indonesia	110	121	1108	821	550	-344	-287	-631	-397	847	350	606	596
Japan	23	25	-31	-65	-70	-34	-34	-68	-76	3	2	0	4
Lao People's Dem Rep	19	23	39	-2	33	-21	-41	-62	-7	55	39	4	0
Madagascar	17	9	38	8	34	-47	-31	-78	0	80	34	6	
Malaysia	23	18	122	60	-226	-45	-62	-107	-248	99	22	68	0
Mexico	53	98	53	-31	-147	-34	-84	-118	-138	79	19	8	-27
Mozambique	43	34	45	8	39	-11	-37	-48	0	42	39	14	
Myanmar	37	40	125	40	50	-96	-85	-181	-4	208	54	12	0
Nigeria	15	14	55	24	288	-15	-31	-46	-5	65	293	5	0
Norway	10	12	2	-18	-21	0	-20	-20	-27	2	3	1	3
Papua New Guinea	27	36	73	17	-5	-8	-57	-65	-13	22	8	60	0
Peru	25	18	54	-7	94	-22	-60	-82	16	70	78	6	0
Russian Federation	608	687	-75	-773	-629	-118	-698	-816	-678	93	7	-49	42
Spain	12	16	-14	-23	-38	-9	-9	-18	-38	0	1	-6	-1
Sudan	24	23	51	47	10	0	-3	-4	-14	22	24	29	0
Sweden	25	28	13	-24	-39	10	-38	-28	-52	2	3	2	10
Thailand	19	17	52	13	-16	-45	-39	-84	-32	85	15	12	0
Turkey	11	23	-13	-23	-79	-9	-10	-19	-81	4	1	-9	0
Ukraine	12	11	-8	-14	-21	-19	-5	-24	-55	9	0	1	34
United Rep of Tanzania	40	48	151	97	77	-16	-54	-70	0	126	77	41	0
United States of America	247	280	-123	-538	-818	-193	-414	-607	-784	94	124	-25	-158
Viet Nam	16	15	100	80	-39	-53	-20	-73	-55	124	16	29	-1
Zambia	37	48	54	-5	39	1	-60	-59	-71	35	110	19	0
Rest of countries	355	510	373	-273	-589	-807	-646	-1453	-1423	919	725	261	109
World	3266	3702	4296	-784	-1684	-2589	-5080	-7670	-6368	5430	4190	1455	495

(1) Based on non-intact forest map (Potapov et al. 2017), except for Canada and Brazil, where the country maps of managed forest were used.

(2) Based on Grassi et al. (2022), using information on the area of managed forest from country reports to UNFCCC, gap-filled with information on the area of secondary forest and plantations from country reports to FAO-FRA 2020. Gap-filling was applied to about 2% of total forest area.

(3) A large part of the forest area reported as managed in the NGHGI (about 120 Mha of 'other native forests') is assumed to be in carbon equilibrium.
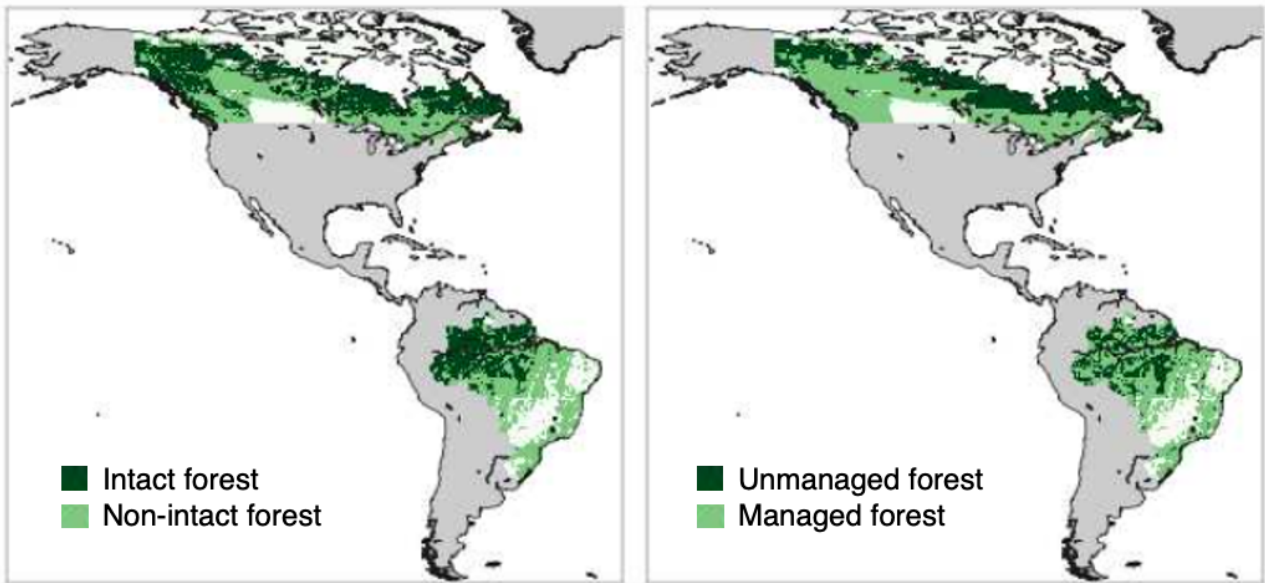
Supplementary Figure 1. Difference between intact/non-intact forest (dark/light green, left panel) and unmanaged/managed forest (dark/light green, right panel) for Canada and Brazil. The intact/non-intact map is from Potapov et al. (2017), the managed/unmanaged map is from the NGHGIs of Canada (Canada, 2021) and Brazil (Brazil, 2020).