

S1. Full search strings for literature search

Common Keywords to all regions

Topic= ("landscape change" OR "landscape dynamics" OR "land use change" OR "land use dynamics" OR "land cover change" OR "land cover dynamics" OR "land cover loss" OR deforest*) AND Topic= (plant* OR "estate" OR farm* OR agri* OR "crop" OR "yield" OR forest* OR "wood" OR "weald" OR "tree") AND Topic= (GEOGRAPHIC LOCATION)

For each *GEOGRAPHIC LOCATION* the following keyword sequences are used by region

Sumatra:

Aceh OR North Sumatra OR West Sumatra OR Riau OR South Sumatra OR Jambi OR Bengkulu OR Lampung

Kalimantan:

North Kalimantan OR Central Kalimantan OR South Kalimantan OR West Kalimantan OR East Kalimantan

S2. Studies included in systematic review

1. Ramdani, F. & Hino, M. Land Use Changes and GHG Emissions from Tropical Forest Conversion by Oil Palm Plantations in Riau Province, Indonesia. *PLoS One* **8**, 1–6 (2013).
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4. Carlson, K. M. *et al.* Committed carbon emissions, deforestation, and community land conversion from oil palm plantation expansion in West Kalimantan, Indonesia. *Proc. Natl. Acad. Sci.* **109**, 7559–7564 (2012).
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Ekologi. *J. Ilmu Lingkung.* **17**, 1–10 (2019).

15. Abram, N. K. *et al.* Synergies for Improving Oil Palm Production and Forest Conservation in Floodplain Landscapes. *PLoS One* **9**, 1–12 (2014).
16. Broich, M. *et al.* Remotely sensed forest cover loss shows high spatial and temporal variation across Sumatera and Kalimantan, Indonesia 2000–2008. *Environ. Res. Lett.* **6**, 014010 (2011).
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18. Cattau, M. E. *et al.* Sources of anthropogenic fire ignitions on the peat-swamp landscape in Kalimantan, Indonesia. *Glob. Environ. Chang.* **39**, 205–219 (2016).
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S3. Source of Studies Included in Systematic Review

No	Source of Literature	Total
1	Agricultural Systems	1
2	Agricultural Economics	2
3	Agriculture, Ecosystems and Environment	2
4	Agroforestry Systems	3
5	AMBIO	1
6	Asia Pacific Viewpoint	5
7	Asian Economic Journal	1
8	Biological Conservation	2
9	Canadian Journal of Development Studies	1
10	Conservation Biology	2
11	Conservation Letters	1
12	Culture & Agriculture	1
13	Ecology and Society	2
14	Ecological Economics	1
15	Ecosystem Services	1
16	Environmental Management	1
17	Environmental Modelling & Software	1
18	Environmental Research Letters	1
19	Forest Ecology and Management	1
20	Forest Policy and Economics	3
21	Forests, Trees and Livelihoods	3
22	Geoforum	1
23	Global Ecology and Conservation	1
24	Global Environmental Change	3
25	Human Ecology	4
26	Hydrobiologia	1
27	International Forestry Review	1
28	International Journal of Applied Earth Observation and Geoinformation	1
29	International Migration	1
30	Journal of Agricultural Economics	1
31	Journal of Biogeography	1
32	Journal of Vegetation Science	1
33	Jurnal Analisis Kebijakan	1
34	Jurnal Ilmu Lingkungan	1
35	Land Degradation and Development	4
36	Land Use Policy	5
37	Landscape Ecology	1
38	Mitigation and Adaptation Strategies for Global Change	1
39	PNAS	1
40	PLOS One	3
41	Procedia Environmental Sciences	2
42	Procedia - Social and Behavioral Sciences	1

43	Remote Sensing of Environment	1
44	Research Communication	1
45	Singapore Journal of Tropical Geography	1
46	Small-scale Forestry	2
47	Soil Science and Plant Nutrition	1
48	The Asia Pacific Journal of Anthropology	2
49	The environmentalist	1
50	The Journal of Peasant Studies	4
51	The Professional Geographer	1
52	The Resilience Alliance	1
53	World Development	4
	Number of Studies	91

S4. Result of NVivo Software for direct causes of land use and land cover change

No	Author	Agricultural Expansion					Forestry Expansion		Land and forest burning	Wood extraction
		Coffee Plantation	Oil palm Plantation	Other types	Rubber plantation	Shifting cultivation	Agroforest	Timber plantations		
1	Gaveau <i>et. al.</i>	0	0	0	0	0	0	0	0	1
2	Ramdani <i>et. al.</i>	0	1	0	1	0	0	0	1	0
3	Smit <i>et. al.</i>	0	1	0	0	0	0	0	0	0
4	Carlson <i>et. al.</i>	0	1	0	0	0	0	0	1	1
5	Dennis <i>et. al.</i>	0	1	0	0	0	0	1	1	1
6	Dennis <i>et. al.</i>	1	1	0	0	0	0	0	1	1
7	Feintrenie <i>et. al.</i>	0	1	0	1	1	1	0	0	0
8	Feintrenie <i>et. al.</i>	0	1	0	1	1	1	0	1	0
9	Lawrence <i>et. al.</i>	0	0	0	0	1	1	0	0	1
10	Margono <i>et. al.</i>	0	1	0	0	1	0	1	1	1
11	Sandker <i>et. al.</i>	0	1	0	0	0	0	0	0	0
12	Villamor & Grace	0	1	0	1	0	0	0	0	0
13	Maryani & Astana	0	1	0	0	0	0	0	0	0
14	Amalia <i>et. al.</i>	0	1	0	0	0	0	0	0	0
15	Abram <i>et. al.</i>	0	1	0	0	0	0	1	0	0
16	Broich <i>et. al.</i>	0	1	0	0	0	0	0	0	0
17	Casson <i>et. al.</i>	0	1	0	0	0	0	1	0	1
18	Cattau <i>et. al.</i>	0	1	0	0	0	0	0	1	0
19	de Jong W.	0	1	0	0	1	0	1	1	0
20	Dewi <i>et. al.</i>	0	1	0	1	0	0	1	0	1
21	Dewi <i>et. al.</i>	0	1	0	1	0	1	0	0	0
22	Elmhirst, R	1	1	0	0	0	0	0	0	0
23	Gatto <i>et. al.</i>	0	1	0	1	0	0	0	0	1

24	Gaveau <i>et. al.</i>	0	0	0	0	0	1	0	0	0
25	Gaveau <i>et. al.</i>	0	0	0	0	0	0	0	0	0
26	Imbernon J.	0	0	0	0	0	0	0	1	0
27	Jelsma <i>et. al.</i>	0	1	0	0	0	0	0	0	0
28	Kartawinata <i>et. al.</i>	0	0	0	0	1	0	0	0	0
29	Klasen <i>et. al.</i>	0	1	0	1	0	0	1	0	0
30	Kunz <i>et. al.</i>	0	1	0	1	0	0	1	0	0
31	McCarthy JF	0	0	0	0	0	0	0	0	1
32	Miettinen <i>et. al.</i>	0	1	0	0	0	0	1	0	0
33	Miyamoto M	0	0	0	0	1	1	0	1	0
34	Müller <i>et. al.</i>	0	1	0	0	1	0	0	0	1
35	Nurdiana <i>et. al.</i>	0	1	0	0	0	0	1	0	1
36	Nurwanda <i>et. al.</i>	0	1	0	0	0	0	0	0	0
37	Prabowo <i>et. al.</i>	0	1	0	0	0	0	1	0	0
38	Sanders <i>et. al.</i>	0	1	0	0	0	0	0	0	0
39	Santika <i>et. al.</i>	0	0	0	0	1	0	0	0	0
40	Santika <i>et. al.</i>	0	1	0	0	0	0	0	0	0
41	Setiawan <i>et. al.</i>	0	1	0	0	0	0	1	1	0
42	Sobur <i>et. al.</i>	0	0	0	0	0	0	0	1	0
43	Stolle <i>et. al.</i>	0	1	0	1	0	0	1	1	0
44	Tsujino <i>et. al.</i>	0	1	0	0	0	0	0	1	1
45	Verbist <i>et. al.</i>	1	0	1	0	0	0	0	0	0
46	Villamor <i>et. al.</i>	0	1	0	1	0	0	0	0	0
47	Aumeeruddy & Sansonnens	0	0	1	0	0	0	0	0	0
48	Chokkalingam <i>et. al.</i>	0	1	0	0	0	0	0	1	0
49	Claridge G	0	0	1	0	0	0	0	1	1
50	Cramb <i>et. al.</i>	0	1	0	1	1	0	1	1	0

51	Feintrenie <i>et. al.</i>	0	1	0	1	1	0	0	0	0
52	Fox <i>et. al.</i>	0	1	0	0	1	0	1	0	1
53	Hariyadi & Ticktin	0	1	0	1	1	0	0	1	0
54	Miettinen & Liew	0	1	0	0	0	0	1	0	1
55	Page <i>et. al.</i>	0	1	0	0	1	0	1	1	1
56	Pirard & Mayer	0	1	0	0	0	0	1	0	0
57	van Oosten <i>et. al.</i>	0	1	0	0	1	0	1	1	0
58	Ekadinata & Vincent	0	1	0	1	0	0	0	0	0
59	Harrington M.	0	0	0	0	0	0	0	0	1
60	Hein <i>et. al.</i>	0	1	0	0	1	0	0	0	1
61	Li Tania M	0	1	0	0	0	0	0	0	0
62	McCarthy JF	0	1	0	0	1	1	0	0	0
63	Pye <i>et. al.</i>	0	1	0	0	1	0	1	0	1
64	Radjawali <i>et. al.</i>	0	0	0	0	0	0	1	0	0
65	Steinebach S	0	1	0	1	0	0	1	0	0
66	Syam <i>et. al.</i>	1	0	0	0	1	0	0	0	0
67	Thaler <i>et. al.</i>	0	1	0	1	1	0	1	0	1
68	Therville <i>et. al.</i>	0	1	0	1	0	0	0	0	0
69	Bettinger KA	0	0	0	0	0	0	0	0	1
70	Dendi <i>et. al.</i>	0	0	1	1	1	1	0	1	0
71	Euler <i>et. al.</i>	0	1	0	0	0	0	0	0	0
72	Feintrenie & Levano	0	1	0	1	1	1	0	0	0
73	Gany & Halli	0	0	1	0	1	0	0	0	0
74	Gaveau <i>et. al.</i>	0	1	1	0	0	0	1	0	1
75	Gaveau <i>et. al.</i>	0	0	0	0	0	0	0	0	1
76	Indrabudi <i>et. al.</i>	0	0	1	0	0	0	0	1	0

77	Krishna <i>et. al.</i>	0	1	0	1	0	1	0	0	0
78	Linkie <i>et. al.</i>	0	0	0	0	0	0	0	0	1
79	Mackie C.	0	0	0	0	1	0	0	1	1
80	Miettinen & Liew	0	1	0	0	0	0	1	1	1
81	Miettinen <i>et. al.</i>	0	1	0	0	1	0	0	1	1
82	Miettinen <i>et. al.</i>	0	1	0	0	0	0	1	1	1
83	Murdiyarso <i>et. al.</i>	0	1	0	1	0	1	1	1	1
84	Otsuka <i>et. al.</i>	1	0	1	0	1	0	0	1	0
85	Potter L.	0	1	0	0	0	1	0	0	1
86	Potter & Badcock	0	1	0	0	0	1	1	0	1
87	Suyanto <i>et. al.</i>	0	1	0	1	1	0	1	1	1
88	Suyanto & Otsuka	0	0	1	0	1	0	0	0	0
89	Thorburn & Kull	0	1	1	0	1	0	1	0	1
90	Toumbourou & Dressler	0	1	1	0	1	0	0	0	0
91	Whitten J.	0	0	0	0	1	0	0	0	0
	Total	5	65	11	23	31	13	30	29	34

S5. Result of NVivo Software for underlying causes of land use and land cover change

Author	Economic factors				Political/Institutional						Policy					Social		Techn ology	
	Econ omic crisis	Industria lization	Mar ket Dem and	Lack of institu tional capaci ty	Differ ences of intere sts	Polit ical Cli mate	Po we r Ab use	Prop erty Righ ts Issu es	Weak of law enforc ement	Overla pping regulat ions	Agricu ltural policy	Decentra lization policy	Develo pment policy	Fore stry Poli cy	Regi onal polic y	Transmi gration policy	Demogr aphics		Netwo rking
Gaveau <i>et. al.</i>	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ramdan i <i>et. al.</i>	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0
Smit <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carlson <i>et. al.</i>	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
Dennis <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Dennis <i>et. al.</i>	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0
Feintren ie <i>et. al.</i>	1	0	1	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0
Feintren ie <i>et. al.</i>	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	0
Lawren ce <i>et. al.</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Margon o <i>et. al.</i>	0	0	1	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0
Sandker <i>et. al.</i>	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Villamo r & Grace	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Maryan i & Astana	1	1	0	0	0	1	0	1	0	1	0	1	0	0	1	0	0	1	0
Amalia <i>et. al.</i>	0	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0

Abram <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Broich <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Casson <i>et. al.</i>	0	1	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0
Cattau <i>et. al.</i>	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
de Jong W.	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0
Dewi <i>et.</i> <i>al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Dewi <i>et.</i> <i>al.</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Elmhirs t, R	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Gatto <i>et.</i> <i>al.</i>	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	1	0	0
Gaveau <i>et. al.</i>	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Gaveau <i>et. al.</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Imbern on J.	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Jelsma <i>et. al.</i>	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Kartawi nata <i>et.</i> <i>al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Klasen <i>et. al.</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Kunz <i>et.</i> <i>al.</i>	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0
McCart hy JF	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0
Miettine n <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Miyamo to M	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0

Müller <i>et. al.</i>	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Nurdia na <i>et. al.</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
Nurwan da <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Prabow o <i>et. al.</i>	0	0	0	1	1	0	1	1	0	1	0	1	0	1	0	0	0	1	0
Sanders <i>et. al.</i>	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0	0	0
Santika <i>et. al.</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Santika <i>et. al.</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Setiawa n <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Sobur <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Stolle <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsujino <i>et. al.</i>	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0
Verbist <i>et. al.</i>	1	0	1	1	0	1	0	1	0	1	0	0	0	0	0	0	1	0	0
Villamo r <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Aumeer uddy & Sansonn ens	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Chokkal ingam <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Claridg e G	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0
Cramb <i>et. al.</i>	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	0
Feintren ie <i>et. al.</i>	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0

Fox <i>et. al.</i>	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Hariyadi & Ticktin	0	0	0	0	0	0	0	<u>1</u>	0	0	0	0	0	0	1	0	0	0	0
Miettinen & Liew	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Page <i>et. al.</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Pirard & Mayer	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	1
van Oosten <i>et. al.</i>	0	1	0	1	0	1	1	1	0	1	0	1	1	1	1	0	0	0	1
Ekadinta & Vincent	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Harrington M.	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Hein <i>et. al.</i>	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	1	0	1
Li Tania M	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	1	0	1
McCarthy JF	1	0	1	1	1	0	0	1	0	1	1	1	1	1	0	0	1	0	1
Pye <i>et. al.</i>	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Radjawali <i>et. al.</i>	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Steinebach S	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	0	1
Syam <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Thaler <i>et. al.</i>	0	0	1	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	1
Therville <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0

Bettinger KA	0	0	0	1	1	1	1	0	0	0	0	1	0	1	0	0	0	1	0
Dendi <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Euler <i>et. al.</i>	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	1
Feintrenie & Levano	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	1	0
Gany & Halli	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	1	0	0
Gaveau <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Gaveau <i>et. al.</i>	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Indrabudi <i>et. al.</i>	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0	1
Krishna <i>et. al.</i>	0	0	1	1	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0
Linkie <i>et. al.</i>	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0
Mackie C.	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Miettinen & Liew	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Miettinen <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Miettinen <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Murdiyarmo <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Otsuka <i>et. al.</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
Potter L.	1	0	1	0	0	1	1	1	0	0	0	1	0	1	0	0	0	1	0
Potter & Badcock	1	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0

Suyanto <i>et. al.</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Suyanto & Otsuka	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Thorbur n & Kull	0	1	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	1	0
Toumbo uou & Dressler	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Whitten J.	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
Total	9	11	19	26	12	15	13	31	12	9	3	20	23	21	10	28	20	19	2

S6. Result of NVivo Software for direct causes of land use and land cover change per province

No	Province	Agricultural expansion				Forestry expansion		Land and forest burning	Wood extraction
		Coffee Plantation	Oil palm Plantation	Other types	Rubber plantation	Shifting cultivation	Agroforest	Timber plantations	
1	North Kalimantan	0	0	0	0	0	0	0	1
2	West Kalimantan	0	0	0	0	0	0	0	1
3	Central Kalimantan	0	0	0	0	0	0	0	1
4	East Kalimantan	0	0	0	0	0	0	0	1
5	South Kalimantan	0	0	0	0	0	0	0	1
6	Riau	0	1	0	1	0	0	0	0
7	West Kalimantan	0	1	0	0	0	0	0	0
8	West Kalimantan	0	1	0	0	0	0	0	1
9	East Kalimantan	0	1	0	0	0	0	1	1
10	South Sumatra	1	1	0	0	0	0	0	1
11	Lampung	1	1	0	0	0	0	0	1
12	Jambi	1	1	0	0	0	0	0	1
13	West Kalimantan	1	1	0	0	0	0	0	1
14	East Kalimantan	1	1	0	0	0	0	0	1
15	Jambi	0	1	0	1	1	1	0	0
16	Jambi	0	1	0	1	1	1	0	0
17	Lampung	0	1	0	1	1	1	0	0
18	West Kalimantan	0	0	0	0	1	1	0	0
19	Jambi	0	1	0	0	1	0	1	1
20	Riau	0	1	0	0	1	0	1	1
21	Lampung	0	1	0	0	1	0	1	1
22	West Sumatra	0	1	0	0	1	0	1	1
23	North Sumatra	0	1	0	0	1	0	1	1
24	South Sumatra	0	1	0	0	1	0	1	1

25	Bengkulu	0	1	0	0	1	0	1	1	1
26	Aceh	0	1	0	0	1	0	1	1	1
27	East Kalimantan	0	1	0	0	0	0	0	0	0
28	Jambi	0	1	0	1	0	0	0	0	0
29	East Kalimantan	0	1	0	0	0	0	0	0	0
30	East Kalimantan	0	1	0	0	0	0	0	0	0
31	East Kalimantan	0	1	0	0	0	0	1	0	1
32	Central Kalimantan	0	1	0	0	0	0	1	0	1
33	Central Kalimantan	0	1	0	0	0	0	0	1	0
34	West Kalimantan	0	1	0	0	1	0	1	1	0
35	East Kalimantan	0	1	0	1	0	0	1	0	1
36	Jambi	0	1	0	1	0	1	0	0	0
37	Lampung	1	1	0	0	0	0	0	0	0
38	Jambi	0	1	0	1	0	0	0	0	1
39	Bengkulu	0	0	0	0	0	1	0	0	0
40	South Sumatra	0	0	0	0	0	1	0	0	0
41	Lampung	0	0	0	0	0	1	0	0	0
42	South Sumatra	0	0	0	0	0	0	0	0	0
43	West Sumatra	0	0	0	0	0	0	0	0	0
44	Lampung	0	0	0	0	0	0	0	1	0
45	Riau	0	1	0	0	0	0	0	0	0
46	East Kalimantan	0	0	0	0	1	0	0	0	0
47	Jambi	0	1	0	1	0	0	1	0	0
48	Jambi	0	1	0	1	0	0	1	0	0
49	Central Kalimantan	0	0	0	0	0	0	0	0	1
50	Central Kalimantan	0	1	0	0	0	0	1	0	0
51	East Kalimantan	0	1	0	0	0	0	1	0	0
52	West Kalimantan	0	1	0	0	0	0	1	0	0
53	South Kalimantan	0	1	0	0	0	0	1	0	0

54	South Sumatra	0	1	0	0	0	0	1	0	0
55	Riau	0	1	0	0	0	0	1	0	0
56	Jambi	0	1	0	0	0	0	1	0	0
57	Jambi	0	0	0	0	1	1	0	1	0
58	East Kalimantan	0	1	0	0	1	0	0	0	1
59	Jambi	0	1	0	0	0	0	1	0	1
60	Jambi	0	1	0	0	0	0	0	0	0
61	West Kalimantan	0	1	0	0	0	0	1	0	0
62	Central Kalimantan	0	1	0	0	0	0	0	0	0
63	West Kalimantan	0	0	0	0	1	0	0	0	0
64	Central Kalimantan	0	0	0	0	1	0	0	0	0
65	East Kalimantan	0	0	0	0	1	0	0	0	0
66	North Kalimantan	0	0	0	0	1	0	0	0	0
67	South Kalimantan	0	0	0	0	1	0	0	0	0
68	West Sumatra	0	0	0	0	1	0	0	0	0
69	South Sumatra	0	0	0	0	1	0	0	0	0
70	Riau	0	0	0	0	1	0	0	0	0
71	Jambi	0	0	0	0	1	0	0	0	0
72	Bengkulu	0	0	0	0	1	0	0	0	0
73	Jambi	0	1	0	0	0	0	1	1	0
74	Riau	0	1	0	0	0	0	1	1	0
75	Lampung	0	1	0	0	0	0	1	1	0
76	West Sumatra	0	1	0	0	0	0	1	1	0
77	North Sumatra	0	1	0	0	0	0	1	1	0
78	South Sumatra	0	1	0	0	0	0	1	1	0
79	Bengkulu	0	1	0	0	0	0	1	1	0
80	Aceh	0	1	0	0	0	0	1	1	0
81	South Sumatra	0	0	0	0	0	0	0	1	0
82	Jambi	0	1	0	1	0	0	1	1	0

83	Riau	0	1	0	0	0	0	0	1	1
84	South Sumatra	0	1	0	0	0	0	0	1	1
85	Lampung	1	0	1	0	0	0	0	0	0
86	Jambi	0	1	0	1	0	0	0	0	0
87	Jambi	0	0	1	0	0	0	0	0	0
88	South Sumatra	0	1	0	0	0	0	0	1	0
89	Jambi	0	0	1	0	0	0	0	1	1
90	East Kalimantan	0	1	0	1	1	0	1	1	0
91	West Kalimantan	0	1	0	1	1	0	1	1	0
92	Jambi	0	1	0	1	1	0	1	1	0
93	Jambi	0	1	0	1	1	0	0	0	0
94	Central Kalimantan	0	1	0	0	1	0	1	0	1
95	West Kalimantan	0	1	0	0	1	0	1	0	1
96	Jambi	0	1	0	1	1	0	0	1	0
97	Jambi	0	1	0	0	0	0	1	0	1
98	Riau	0	1	0	0	0	0	1	0	1
99	Lampung	0	1	0	0	0	0	1	0	1
100	West Sumatra	0	1	0	0	0	0	1	0	1
101	North Sumatra	0	1	0	0	0	0	1	0	1
102	South Sumatra	0	1	0	0	0	0	1	0	1
103	West Kalimantan	0	1	0	0	0	0	1	0	1
104	South Kalimantan	0	1	0	0	0	0	1	0	1
105	Central Kalimantan	0	1	0	0	1	0	1	1	1
106	South Sumatra	0	1	0	0	0	0	1	0	0
107	West Kalimantan	0	1	0	0	1	0	1	1	0
108	Jambi	0	1	0	1	0	0	0	0	0
109	Central Kalimantan	0	0	0	0	0	0	0	0	1
110	Jambi	0	1	0	0	1	0	0	0	1
111	West Kalimantan	0	1	0	0	0	0	0	0	0

141	South Sumatra	0	0	0	0	0	0	0	0	1
142	Aceh	0	0	0	0	0	0	0	0	1
143	South Kalimantan	0	0	1	0	0	0	0	1	0
144	Jambi	0	1	0	1	0	1	0	0	0
145	Aceh	0	0	0	0	0	0	0	0	1
146	East Kalimantan	0	0	0	0	1	0	0	1	1
147	Jambi	0	1	0	0	0	0	1	1	1
148	Riau	0	1	0	0	0	0	1	1	1
149	Lampung	0	1	0	0	0	0	1	1	1
150	West Sumatra	0	1	0	0	0	0	1	1	1
151	North Sumatra	0	1	0	0	0	0	1	1	1
152	South Sumatra	0	1	0	0	0	0	1	1	1
153	Bengkulu	0	1	0	0	0	0	1	1	1
154	East Kalimantan	0	1	0	0	0	0	1	1	1
155	West Kalimantan	0	1	0	0	0	0	1	1	1
156	Central Kalimantan	0	1	0	0	0	0	1	1	1
157	South Kalimantan	0	1	0	0	0	0	1	1	1
158	Jambi	0	1	0	0	1	0	0	1	1
159	West Kalimantan	0	1	0	0	0	0	1	1	1
160	Jambi	0	1	0	0	0	0	1	1	1
161	Riau	0	1	0	0	0	0	1	1	1
162	South Sumatra	0	1	0	0	0	0	1	1	1
163	Jambi	0	1	0	1	0	1	1	1	1
164	Jambi	1	0	1	0	1	0	0	1	0
165	West Sumatra	1	0	1	0	1	0	0	1	0
166	East Kalimantan	0	1	0	0	0	1	0	0	1
167	West Kalimantan	0	1	0	0	0	1	0	0	1
168	Riau	0	1	0	0	0	1	1	0	1
169	Riau	0	1	0	1	1	0	1	1	1

170	Jambi	0	0	1	0	1	0	0	0	0
171	West Sumatra	0	0	1	0	1	0	0	0	0
172	Riau	0	1	1	0	1	0	1	0	1
173	East Kalimantan	0	1	1	0	1	0	0	0	0
174	Jambi	0	0	0	0	1	0	0	0	0
175	Riau	0	0	0	0	1	0	0	0	0
176	Lampung	0	0	0	0	1	0	0	0	0
177	West Sumatra	0	0	0	0	1	0	0	0	0
178	North Sumatra	0	0	0	0	1	0	0	0	0
179	South Sumatra	0	0	0	0	1	0	0	0	0
180	Bengkulu	0	0	0	0	1	0	0	0	0
181	Aceh	0	0	0	0	1	0	0	0	0
182	East Kalimantan	0	0	0	0	1	0	0	0	0
183	West Kalimantan	0	0	0	0	1	0	0	0	0
184	Central Kalimantan	0	0	0	0	1	0	0	0	0
185	South Kalimantan	0	0	0	0	1	0	0	0	0

S7. Result of NVivo Software for underlying causes of land use and land cover change per province

Research Site	Economic factor			Institutional/politic factor						Policy factor					Social factor				
	Econ omic crisis	Industrial ization	Mar ket Dem and	Lack of institut ional capacit y	Differ ences of interes ts	Polit ical Clim ate	Po wer Ab use	Prop erty Righ ts Issue s	Weak of law enforce ment	Overla pping regulati ons	Agricu ltural policy	Decentral ization policy	Develo pment policy	Fore stry Polic y	Regi onal polic y	Transmi gration policy	Demogr aphics	Netwo rking	Techn ology
North Kalim antan				1	1														
West Kalim antan				1	1														
Centra l Kalim antan				1	1														
East Kalim antan				1	1														
South Kalim antan				1	1														
Riau		1	1					1				1	1		1	1			
West Kalim antan																			
West Kalim antan			1					1						1					
East Kalim antan																1			
South Sumat ra				1			1	1								1			
Lamp ung				1			1	1								1			

Jambi		1		1	1				1
West Kalim antan		1		1	1				1
East Kalim antan		1		1	1				1
Jambi	1		1				1		1
Jambi		1		1			1		1 1
Lamp ung				1					1
West Kalim antan				1					
Jambi		1		1		1		1	
Riau		1		1		1		1	
Lamp ung		1		1		1		1	
West Sumat ra		1		1		1		1	
North Sumat ra		1		1		1		1	
South Sumat ra		1		1		1		1	
Bengk ulu		1		1		1		1	
Aceh		1		1		1		1	
East Kalim antan				1			1		
Jambi							1		
East Kalim antan	1	1		1		1		1	1

East Kalim antan	1				1				1				1											
East Kalim antan	1				1				1				1											
Centra l Kalim antan	1				1				1				1											
Centra l Kalim antan	1				1				1				1											
West Kalim antan	1				1				1				1											
East Kalim antan													1											
Jambi	1												1				1							
Lamp ung					1																			
Jambi					1				1				1				1				1			
Bengk ulu	1	1			1	1			1			1			1			1						
South Sumat ra	1	1			1	1			1			1			1			1						
Lamp ung	1	1			1	1			1			1			1			1						
South Sumat ra	1																1							
West Sumat ra	1																1							
Lamp ung	1																1							

[illegible]

Central Kalimantan	1	1	1	1	1	1
West Kalimantan	1					
Central Kalimantan	1					
East Kalimantan	1					
North Kalimantan	1					
South Kalimantan	1					
West Sumatra	1					
South Sumatra	1					
Riau	1					
Jambi	1					
Bengkulu	1					
Jambi						1
Riau	1					1
Lampung						1
West Sumatra						1

[illegible]

West Kalim antan		1			1		1	1						1		1
Jambi	1		1	1	1		1		1	1	1	1		1		1
West Kalim antan		1		1			1									1
West Kalim antan			1	1						1						
Jambi					1		1				1	1				1
South Sumat ra														1	1	
Lamp ung														1	1	
East Kalim antan			1				1	1	1				1			1
Jambi											1		1		1	
Bengk ulu			1	1	1	1				1		1				1
Jambi			1	1	1					1		1				
West Sumat ra			1	1	1					1		1				
South Sumat ra			1	1	1					1		1				
West Sumat ra										1						
Jambi			1				1	1			1					
Jambi				1			1				1					1
Lamp ung			1				1				1			1	1	
Jambi													1			

Riau	1				1			
Lampung					1			
West Sumatra					1			
North Sumatra					1			
South Sumatra					1			
Bengkulu					1			
Aceh					1			
Jambi	1				1		1	
Riau	1				1		1	
Lampung	1				1		1	
West Sumatra	1				1		1	
North Sumatra	1				1		1	
South Sumatra	1				1		1	
Aceh	1				1		1	
South Kalimantan	1		1		1		1	
Jambi	1		1		1		1	
Aceh	1		1		1		1	
East Kalimantan	1				1		1	

Jambi	1	1
Riau	1	1
Lampung	1	1
West Sumatra	1	1
North Sumatra	1	1
South Sumatra	1	1
Bengkulu	1	1
East Kalimantan	1	1
West Kalimantan	1	1
Central Kalimantan	1	1
South Kalimantan	1	1
Jambi		1
West Kalimantan		
Jambi		
Riau		
South Sumatra		
Jambi		1

Jambi	1					1				
West Sumat ra	1					1				
East Kalim antan	1	1	1	1	1	1	1	1	1	
West Kalim antan	1	1	1	1	1	1	1	1	1	
Riau	1	1	1	1	1					1
Riau	1					1				
Jambi						1				
West Sumat ra										
Riau	1	1	1		1	1	1	1	1	
East Kalim antan	1									
Jambi	1		1		1		1			
Riau	1		1		1		1			
Lamp ung	1		1		1		1			
West Sumat ra	1		1		1		1			
North Sumat ra	1		1		1		1			
South Sumat ra	1		1		1		1			
Bengk ulu	1		1		27		1			
Aceh	1		1		1		1			

East Kalim antan	1	1	1
West Kalim antan	1	1	1
Centra l Kalim antan	1	1	1
South Kalim antan	1	1	1

S8. Result of combination for underlying causes and direct causes

	Agricultural expansion					Forestry expansion		Land and forest burning	Wood extraction
	Coffee Plantation	Oil palm Plantation	Other types	Rubber plantation	Shifting cultivation	Agroforest	Timber plantations		
Economic crisis	1	6	1	1	2	5	1	1	3
Industrialization	0	9	1	2	5	1	5	6	5
Market Demand	1	16	1	6	6	7	5	6	9
Lack of institutional capacity	2	17	4	2	11	4	10	7	11
Differences of interest	0	6	1	2	3	3	3	1	4
Political Climate	2	12	1	3	5	5	6	3	7
Power abuse	1	12	1	1	6	1	5	2	8
Property Rights Issues	3	24	6	10	15	6	9	9	9
Weak of law enforcement	0	7	2	1	5	1	3	2	7
Overlapping regulation	1	6	2	1	2	1	3	2	1
Agricultural policy	0	3	0	1	2	1	1	1	1
Decentralization policy	0	16	1	6	8	6	4	6	8
Development policy	0	18	1	8	7	4	9	10	6
Forestry policy	0	19	2	4	8	1	12	7	11
Regional policy	0	9	0	5	2	2	1	2	2
Transmigration policy	2	22	2	13	12	5	7	13	10
Demographic	4	8	6	3	7	2	3	8	8
Networking	0	17	1	3	8	4	10	2	9
Technology	0	1	1	0	0	0	0	1	0

S9. Result of NVivo Software for actors of land use and land cover change

No	Author	Performer actors				Decision maker actors				Supported actors			
		Private Company	Public companies	Traditional land owners	Farmers	Government	Elite	Politician	Village officials	Military	Bank	Donor	NGO
1	Gaveau <i>et. al.</i>	1	0	0	0	0	0	0	0	0	0	0	0
2	Ramdani <i>et. al.</i>	1	1	0	0	0	0	0	0	0	0	0	0
3	Smit <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
4	Carlson <i>et. al.</i>	1	1	0	1	3	0	0	0	0	0	0	0
5	Dennis <i>et. al.</i>	1	0	0	0	0	0	0	0	0	0	0	0
6	Dennis <i>et. al.</i>	1	0	0	1	2	0	0	0	0	0	0	0
7	Feintrenie <i>et. al.</i>	1	0	0	2	1	0	0	0	0	1	0	0
8	Feintrenie <i>et. al.</i>	0	1	1	1	1	0	0	0	0	0	0	0
9	Lawrence <i>et. al.</i>	1	0	0	1	0	0	0	0	0	0	0	0
10	Margono <i>et. al.</i>	1	0	0	0	0	0	0	0	0	0	0	0
11	Sandker <i>et. al.</i>	1	0	0	1	1	0	0	0	0	0	0	0
12	Villamor & Grace	1	0	1	1	1	0	0	0	0	0	0	0
13	Maryani & Astana	1	0	0	1	0	0	0	0	0	0	0	0
14	Amalia <i>et. al.</i>	2	0	0	2	0	0	0	0	0	0	0	0
15	Abram <i>et. al.</i>	1	0	0	1	0	0	0	0	0	0	0	0
16	Broich <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
17	Casson <i>et. al.</i>	1	0	0	1	1	0	1	0	0	0	0	1
18	Cattau <i>et. al.</i>	0	0	0	1	0	0	0	0	0	0	0	0
19	de Jong W.	0	1	1	1	1	0	0	0	0	0	0	0
20	Dewi <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
21	Dewi <i>et. al.</i>	1	0	0	1	0	0	0	0	0	0	0	0
22	Elmhirst, R	0	0	0	0	0	0	0	0	0	0	1	0
23	Gatto <i>et. al.</i>	1	0	0	1	1	0	0	0	0	0	0	0
24	Gaveau <i>et. al.</i>	0	0	0	1	1	1	0	0	0	0	0	1
25	Gaveau <i>et. al.</i>	0	0	0	0	1	0	0	0	0	0	0	0

26	Imbernon J.	1	1	1	0	0	0	0	0	0	0	0	0
27	Jelsma <i>et. al.</i>	0	0	0	1	0	0	0	0	0	0	0	0
28	Kartawinata <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
29	Klasen <i>et. al.</i>	2	0	0	2	2	0	1	0	0	1	0	0
30	Kunz <i>et. al.</i>	0	0	1	0	1	0	0	0	0	0	0	0
31	McCarthy JF	1	0	1	0	1	0	1	1	0	0	1	0
32	Miettinen <i>et. al.</i>	1	0	0	2	0	0	0	0	0	0	0	0
33	Miyamoto M	0	0	0	0	1	0	0	0	0	0	1	0
34	Müller <i>et. al.</i>	0	0	0	1	1	0	0	0	0	0	0	0
35	Nurdiana <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
36	Nurwanda <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
37	Prabowo <i>et. al.</i>	0	1	0	0	3	0	0	0	0	0	0	0
38	Sanders <i>et. al.</i>	1	0	1	2	2	0	0	3	1	1	1	2
39	Santika <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
40	Santika <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
41	Setiawan <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
42	Sobur <i>et. al.</i>	0	0	0	0	0	0	0	0	0	0	0	0
43	Stolle <i>et. al.</i>	2	0	0	2	0	0	0	0	0	0	0	0
44	Tsujino <i>et. al.</i>	1	0	0	0	1	0	0	0	0	0	0	0
45	Verbist <i>et. al.</i>	0	0	0	1	1	0	0	0	0	0	0	0
46	Villamor <i>et. al.</i>	1	1	0	1	1	0	0	0	0	0	1	1
47	Aumeeruddy & Sansonnens	0	0	0	0	0	0	0	0	0	0	0	1
48	Chokkalingam <i>et. al.</i>	1	0	1	1	1	0	0	0	0	0	0	0
49	Claridge G	0	0	0	1	2	0	0	0	0	0	0	0
50	Cramb <i>et. al.</i>	2	0	2	2	3	0	0	0	0	0	0	0
51	Feintrenie <i>et. al.</i>	1	0	1	1	1	0	0	0	0	1	0	0
52	Fox <i>et. al.</i>	1	1	0	0	1	0	0	1	0	0	1	0
53	Hariyadi & Ticktin	0	0	1	1	0	1	0	0	0	0	0	0

83	Murdiyarso <i>et. al.</i>	1	1	1	1	2	0	0	0	0	0	0	0
84	Otsuka <i>et. al.</i>	0	0	2	0	0	0	0	0	0	0	0	0
85	Potter L.	1	0	0	0	1	1	0	0	1	0	1	0
86	Potter & Badcock	1	1	0	1	1	0	0	1	0	0	1	0
87	Suyanto <i>et. al.</i>	1	0	0	0	0	0	0	0	0	0	0	0
88	Suyanto & Otsuka	0	0	0	1	0	0	0	0	0	0	0	0
89	Thorburn & Kull	1	1	0	0	2	0	0	1	1	0	0	1
90	Toumbourou & Dressler	0	1	0	0	1	0	1	1	0	0	0	1
91	Whitten J.	1	0	0	0	1	0	0	0	0	1	1	0
Total		61	20	23	63	69	7	20	12	10	7	15	18