

Pelopor Data Statistik Terpercaya Untuk Semua

Pilot ecosystem account for Indonesia peatlands in Sumatera and Kalimantan

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SEEA IMPLEMENTATION IN INDONESIA



Indonesia Peatlands

110° E

- Indonesia has 14.9 Mha peatlands (7.9% of its land cover)
- The peatlands scatter mainly 43% in Sumatra, 32% in Kalimantan, and 25% in Papua



2017 Pilot peat ecosystems in Indonesia focused on:

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- 1. Extent account: changes of peatland land cover
- 2. Condition account: changes in the environmental state ofprecipitation, hotspot, water level and vegetation biomass (Based on internship repo

- 3. ecosystem services account: oil palm, biomass for pulp, paddy, timber, CO2 sequestration, and biodiversity habitat
- carbon account: to monitor the change in carbon stocks and emissions (net carbon flux and peat forest fires) in peatlands

Summary table

Beatland	Indicator	Unit	Year						
reauand			1990	1996	2000	2006	2009	2013	2014
Type of lan	d cover								
Sumatra	Undisturbed forest	1000ha	481	450	378	402	281		225
	Disturbed forest	1000ha	4159	3824	2659	2081	1642		1257
	Water	1000ha	5	5	5	4	4		4
	Degraded peatland	1000ha	768	829	1447	1468	1720		1394
	Bare ground	1000ha	33	96	213	466	355		380
	Urban	1000ha	30	31	35	35	35		34
	Forest plantation	1000ha	7	32	48	262	420		864
	Perennial crops	1000ha	378	535	941	1007	1211		1398
	Dry agricultural land	1000ha	317	365	422	421	479		612
	Paddy field	1000ha	192	202	213	214	215		192
	Others	1000ha	7	1	16	17	15		15
Kalimantan	Undisturbed forest	1000ha	113	80	68	62	58		50
	Disturbed forest	1000ha	3790	3234	2978	2799	2565		2308
	Water	1000ha	6	5	5	5	5		6
	Degraded peatland	1000ha	589	1083	1335	1432	1500		1532
	Bare ground	1000ha	27	44	44	62	94		203
	Urban	1000ha	59	73	83	131	256		336
	Forest plantation	1000ha	0	1	0	Û	1		300
	Perennial crops	1000ha	59	73	83	131	256		336
	Dry agricultural land	1000ha	231	243	248	268	270		284
	Paddy field	1000ha	68	113	113	115	126		126
	Others	1000ha	1	1	1	1	2		3

Sumatra	Precipitation	mm/year			2633	2571	2520	-	2119
	Hotspots	number of hotspots				23187	13472		31655
	Dry biomass*	Mt	1384	1320	1085	1007	929		1172
	Water level ^b	cm	•					89.15	
Kalimantan	Precipitation	mm/year			3056	2610	2740		2757
	Hotspots	number of hotspots				22618	16489		13659
	Dry biomass*	Mt	1172	1024	961	925	880		826
	Water level*	cm .						76.62	
Ecosystem	services								
Sumatra	Timber production	1000m ³			2057	1922	1748		1556
	Oil palm production	10000			10389	17809	20777		23635
	Biomass production for pulp	1000:			1011	5503	8833		18161
	Paddy production*	1000t			620	625	627		561
	CO ₂ sequestration	1000:002			7175	7629	5337		4282
	Biodiversity habitat	1000ha			442	451	423		416
Kalimantan	Timber production*	1000m ³			1089	885	679		516
	Oil palm production	1000t			14	703	4328		8022
	Biomass production for pulp*	1000:			0	2	24		624
	Paddy production'	10000			192	196	214		214
	CO ₂ sequestration*	1000:002			1299	1182	1099		958
	Biodiversity habitat	1000ha			892	851	816		794
Carbon									
Sumatra	Carbon stocks	MtCO ₂	2388	2277	1872	1737	1603		1599
	Carbon emissions	MICO2	131	146	178	195	225	•	272
	Carbon emissions ⁴	MICO2				35	16		50
Kalimantan	Carbon stocks	MtCO ₂	2021	1767	1658	1595	1518		1425
	Carbon emissions	MICO2	91	94	95	99	108		115
	Carbon emissions4	MECO2				68	64		44

Note: *ES based on land cover data, *:vegetation, *:average value in plantation and agrigultural lands, *:net carbon flux, 4:from peat forest fires

Main results

- 1. It is found that 52% of peat forests in Kalimantan and Sumatra in 1990 have been converted to other land uses in 2014. Conversion of peat forests in Sumatra was more significant compared to peat forest conversion in Kalimantan.
- 2. Oil palm production has expanded significantly and generated the highest monetary value
- 3. Around 31% of carbon stocks in 1990 was lost in 2014.
- 4. Meanwhile, the total emissions fror net carbon (CO2) flux increased by 74% during the same period.
 Depending upon the costs attribute to the emitted carbon, the costs of these emissions may exceed the benefits of the plantation cropping.



Figure 3. Spatial distribution of land cover types in Sumatra in 1990 and 2014/2015.



(Based on internship report b Figure 4. Spatial distribution of land cover types in Kalimantan in 1990 and 2014/2015.

Challenges

- Firstly, land cover maps from MoEFRI are only able to distinguish the land cover between perennial crop, forest plantation, wet and dry agricultural land. In fact, peatlands are converted to diverse agricultural purposes such as oil palm, rubber, coconut palm, paddy, sago, and other types of horticultural and seasonal plant. This limits the study to analyse more detailed information about economic activities (provisioning services) in peatlands.
- Second, the prediction of the future condition is essential to support policy-making process. This information is not provided in the accounts because the framework of SEEA is based on the historical and current data. Even though there is an ecosystem asset account in SEEA that is able to predict the net present value (NPV) of the ecosystem assets. This account is developed for a specific discount period, like for 15-25 years, to evaluate future cash flows based on the present value.

Apendix

Table 2. Indicators f	or physical v	alue of specific ES	provided by	peatland ecosy	stem in Indonesia
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Type of ES	ES specification	Indicator	Method
Provisioning	Timber production*	Annual timber harvested (m ³ /year)	Timber production rate*total
services			forest area (excluding forest in protected area)
	Oil palm production	Annual fresh fruit branch (FFB) of oil	Oil palm (FFB) production
		palm harvested (ton/year)	rate*total area of oil palm
			plantation
	Biomass production	Annual acacia biomass harvested	Biomass (acacia) production
	for pulp*	(m ³ /year)	rate*total area of acacia
			plantation
	Paddy production*	Annual paddy harvested (ton/year)	Paddy production rate*total area of paddy field
Regulating	CO ₂ sequestration*	Net carbon (CO ₂) flux of undisturbed	Net carbon (CO ₂) flux of
services		forests (ton CO ₂ /year)	undisturbed forests*total area of undisturbed peat forest
Cultural	Biodiversity habitat*	Total area of peat swamp forests inside	Total area of peat forest in
services		protected areas that are not converted	protected area
	·	to other land uses since 2000 (ha)	· · · · · · · · · · · · · · · · · · ·

*ES estimated from MoEFRI land cover data



Table 3. Indicators for monetary value of specific ES provided by peatland ecosystem in Indonesia

Type of ES	ES specification	Indicator	Method
Provisioning	Timber production*	Resource rent (IDR/year) (Timber price*total production) -
services	Oil palm production*	Resource rent (IDR /year	 production cost (FFB price*total production) - production cost
	Biomass production for pulp*	Resource rent (IDR /year	 (Biomass price*total production) - production cost
	Paddy production*	Resource rent (IDR /year) (Paddy price*total production) - production cost
Regulating services	CO ₂ sequestration*	Social cost of carbon (IDR /year)	Total CO_2 sequestration*cost of carbon (CO_2)
Cultural services	Biodiversity habitat*	Restoration cost (IDR /year)	Total area of peat forest in protected area*restoration cost

*ES estimated from MoEFRI land cover data



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