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MEASURING ECOSYSTEM SERVICES: INDONESIA EXPERIENCE

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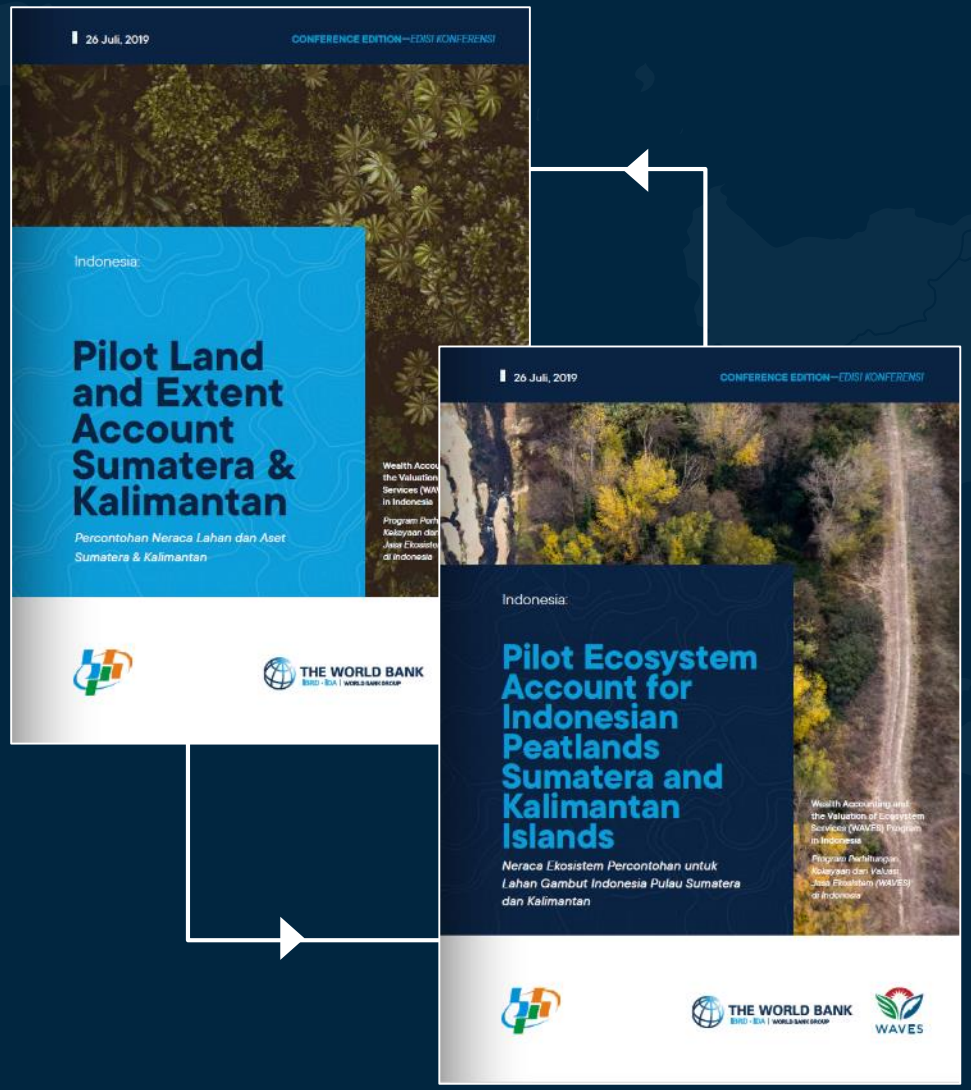
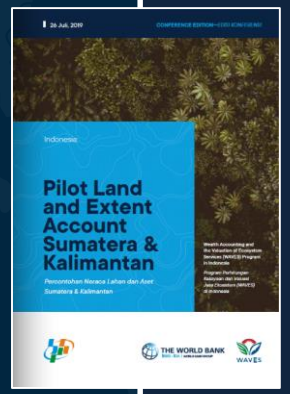
Pilot Ecosystem Accounts



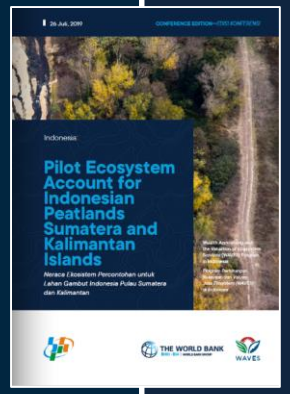
- BPS had collaboration with World Bank in the Wealth Accounting and the Valuation of Ecosystem Services program for Indonesia (I-WAVES).
- The I-WAVES program had supported BPS in the compilation of
  - Pilot Land and Extent Account Sumatera and Kalimantan; and
  - Pilot Ecosystem Account for Indonesian Peatlands Sumatera and Kalimantan Islands
- This program aimed to test and pilot the System of Environmental Economic Accounting – Experimental Ecosystem Accounting Approach (SEEA-EEA), for a specific, policy relevant ecosystem type, i.e. Indonesian peatlands.

Dissemination Products



PILOT LAND AND EXTENT ACCOUNT SUMATERA AND KALIMANTAN

- Display the changes in land cover over time, differentiating between the main land cover classes in Indonesia from 1990 to 2014.
- Present the ecosystem extent account which focused on providing information on the use of land and ecosystem in Sumatera and Kalimantan Islands.



PILOT ECOSYSTEM ACCOUNT FOR INDONESIAN PEATLANDS SUMATERA AND KALIMANTAN ISLANDS

- Present ecosystem accounts for peatlands in the Indonesian islands of Sumatera and Kalimantan.
- Scope of study: (1) ecosystem extent account, (2) ecosystem condition account, (3) ecosystem services account, and (4) carbon account.

(1)Extent Accounts for Peatland

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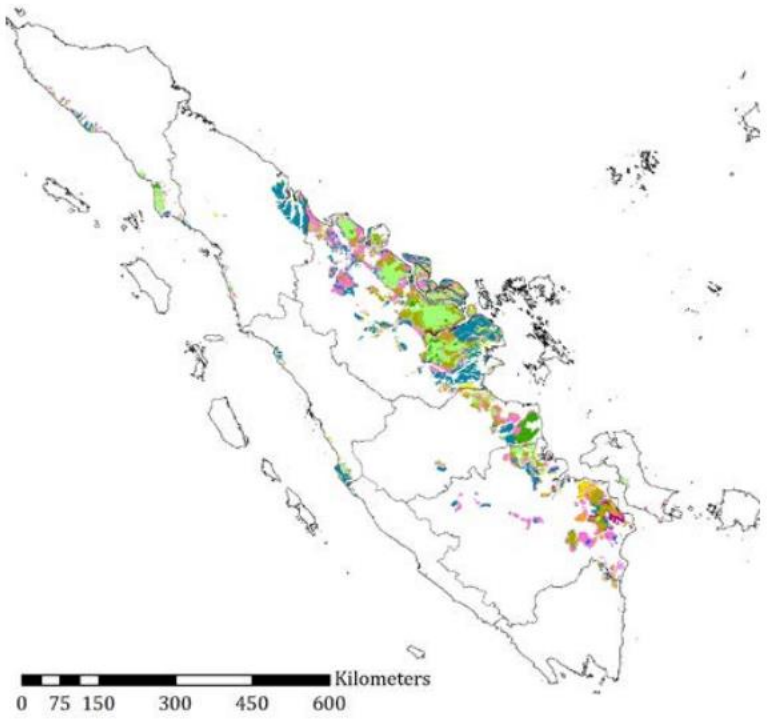
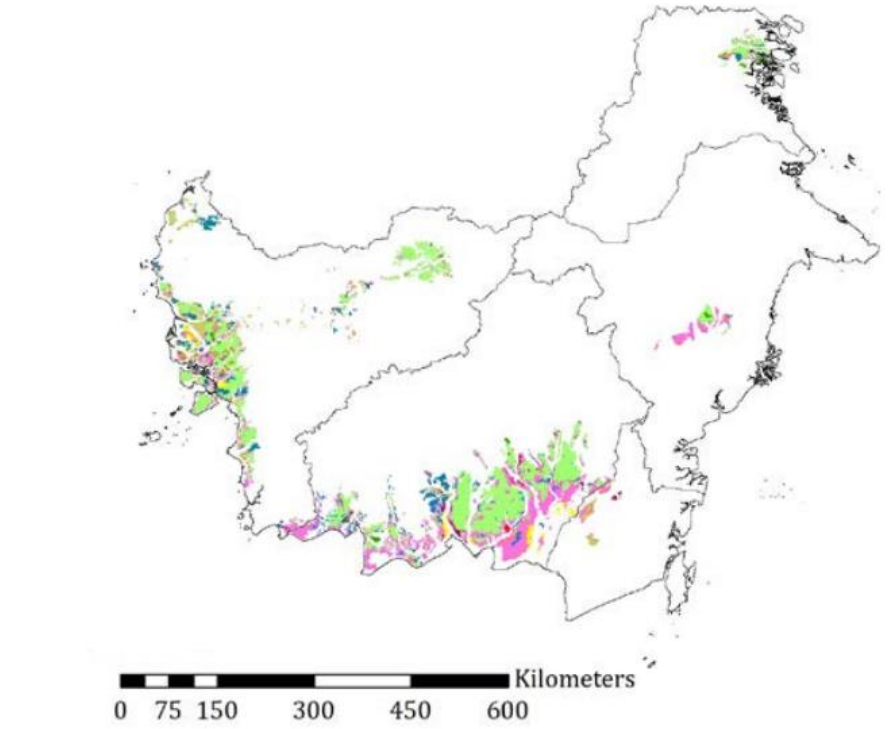
WAVES

Spatial Distribution of Land Cover Types in Sumatera and Kalimantan, 2015



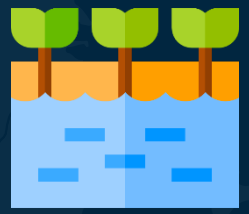


- During 1990-2015, the most notable change of land cover in Sumatera and Kalimantan peatlands is the reduction of natural forests.

(2) Condition Accounts

Vegetation Biomass

- During 1990-2015, 35 percent and 27 percent of total vegetation biomass was lost in Sumatera and Kalimantan respectively.



Groundwater Level

- The annual average of water level in 2013 varied from 0-117 cm in Sumatera and from 0-96 cm in Kalimantan.

Hotspots

- The highest percentage of total hotspots was in peatlands covered by wet shrub.

(3)Ecosystem Services Accounts

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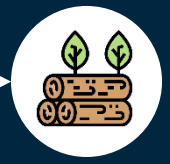
WAVES

1 PROVISIONING SERVICES

-  Timber Production
-  Biomass Production for Pulp
-  Paddy Production

2 REGULATING SERVICES

-  CO_2 Sequestration

3 CULTURAL SERVICES

-  Protected Habitat

(3)Ecosystem Services Accounts

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WAVES

Ecosystem Services Spesification	Indicators for Physical Valuation	Indicators for Monetary Valuation
Timber Production	Annual Timber Harvested (m^3/year)	Resource Rent (IDR/year)
Biomass Production for Pulp	Annual Acacia Biomass Harvested (m^3/year)	Resource Rent (IDR/year)
Paddy Production	Annual Paddy Harvested (ton/year)	Resource Rent (IDR/year)
CO_2 Sequestration	Net Carbon (CO_2) Flux of Undisturbed Forest (ton CO_2/year)	Social Cost of Carbon (IDR/year)
Protected Habitat	Total area of peat swamp forests inside protected areas that are not converted to other land uses since 2000 (ha)	Restoration Cost (IDR/year)

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Physical Values of Ecosystem Services in Sumatera and Kalimantan Peatlands

ES specification *Spesifikasi jasa ekosistem*	Unit *Unit*		Physical value of ES *Nilai fisik jasa ekosistem*			
			2000	2005/2006	2009/2010	2014/2015
Timber production *Produksi kayu*	1000 m3/year (tahun)	Sumatera	1893	1482	1094	777
		Kalimantan	794	741	666	576
Biomass production for pulp *Produksi biomassa untuk bubur kayu*	1000 m3/year (tahun)	Sumatera	1011	5503	8833	18161
		Kalimantan	0	2	24	624
Paddy production *Produksi padi*	1000 m3/year (tahun)	Sumatera	620	625	627	561
		Kalimantan	192	196	214	214
CO_2 sequestration *Penyerapan CO_2*	1000 m3/year (tahun)	Sumatera	7175	7629	5337	4282
		Kalimantan	1299	1182	1099	958
Protected habitat *Habitat lindung*	1000 m3/year (tahun)	Sumatera	442	451	423	416
		Kalimantan	892	851	816	794

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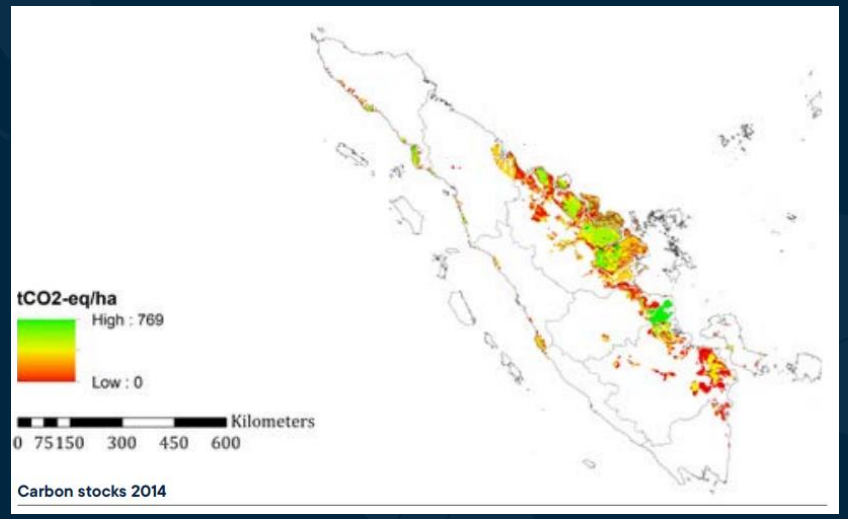
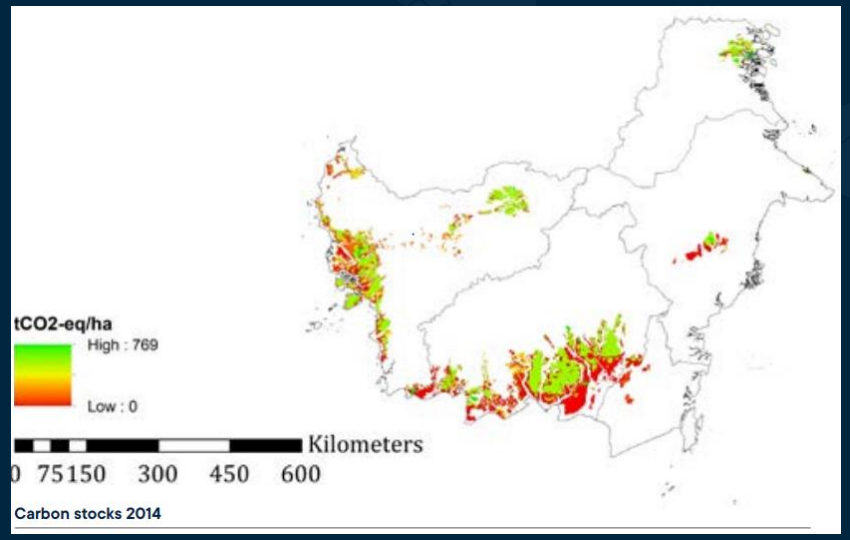
Monetary Values of Ecosystem Services in Sumatera and Kalimantan Peatlands

ES specification *Spesifikasi jasa ekosistem*		Physical value of ES *Nilai fisik jasa ekosistem*			
		2000	2005/2006	2009/2010	2014/2015
Timber production *Produksi kayu*	Sumatera	1278	1001	739	525
	Kalimantan	536	500	450	389
Biomass production for pulp *Produksi biomassa untuk bubur kayu*	Sumatera	95	518	831	1709
	Kalimantan	0	0	2	59
Paddy production *Produksi padi*	Sumatera	1510	1522	1526	1365
	Kalimantan	338	344	375	376
CO_2 sequestration *Penyerapan CO_2*	Sumatera	2498	2656	1858	1491
	Kalimantan	452	412	383	334
Protected habitat *Habitat lindung*	Sumatera	-	-	-	-
	Kalimantan	-	-	-	-

(4) Carbon Accounts





Carbon Stocks

Indicator *Indikator*	Peatland in *Rawa*	Mt CO_2				
		1990	1995/1996	2005/2006	2009/2010	2014/2015
Carbon stock (Vegetation) *Stok karbon (Vegetasi)*	Sumatera	2707	2148	1980	1819	1770
	Kalimantan	2107	1759	1702	1628	1770

- Deforestation and land use changes in peatland lead to the decrease of carbon stored in vegetation.
- The decrease in carbon stocks was found in every province.

Challenges and Limitations

- **Uncertainty in the peatland area and land cover data**
  - Several peatland maps have been published by different institutions with different figure of total areas.
  - There are uncertainties in land cover in peatlands, related to the accuracy related to resolution of land cover maps from the Ministry of Environment and Forestry.
- **Lack of sufficient data points to estimate groundwater level**
- **The ecosystem service account has uncertainties related to the flows of ecosystem services**
  - Only data of market prices can be accessed in some governmental publications.
  - The data are not specifically from particular ecosystem type (peatland).
  - The available data are generalized at island and national level, not at specific area (provincial or district level) due to the limited number of sources.
- **Uncertainty in the combustion and emission factor for carbon emissions**

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THANK YOU

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