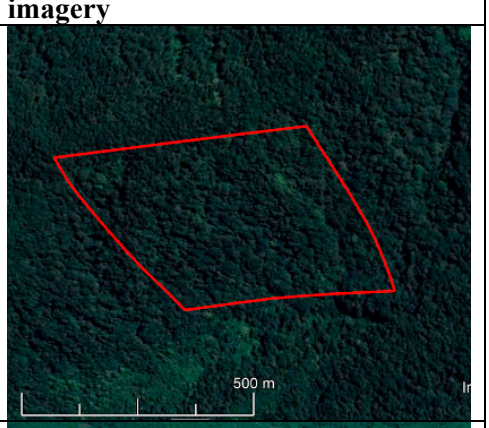
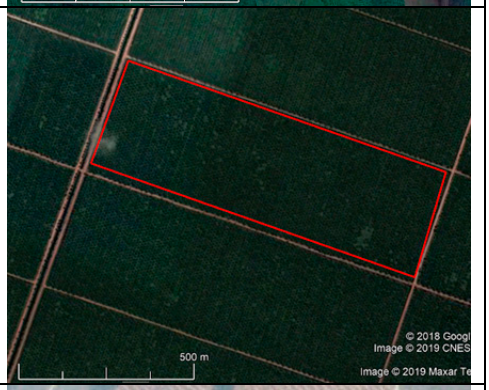
Supplementary Material

Supplementary Table 1. Description of five land cover classes used in image classification.

Code	Land-cover Class	Description	Number of polygons or ROI	Example of ROI extracted from Google Earth Pro high-quality imagery
FOR	Forest	Closed canopy forest with fairly continuous tree cover, heterogeneous tree height. Located away from human settlements, at the edge of intact forest, or as large patches in agricultural landscapes.	140	
FSM	Forest-Shrub-Mosaic	Degraded woody vegetation with low and sparse tree cover. Includes degraded forests and forest fragments located close to human settlements.	155	
OPM	Oil Palm	Closed and fairly closed canopy oil palm trees interspersed along straight lines and having regular patterns. Some bare ground or grass can be visible between oil palm rows.	125	
BGC	Bare ground - Crop	Croplands without trees, exposed soil or ground with low vegetation cover.	137	

URB	Built-up area	Include developed land like building, roads and human settlements	114	
WTR	Water	Freshwater rivers and lakes, saltwater bodies such as oceans, and flooded areas.	117	

S**upplementary Table 2.** Number of training and testing pixels for each image stack.

Image stack	**Training pixels**	**Testing pixels**
SAR	191,663	108,816
Landsat	133,064	75,502
Combined	133,039	75,501

Supplementary Table 3. Error matrices for Landsat classified image. PA = Producer's Accuracy, UA = User's Accuracy, OA = Overall Accuracy.

Landsat	Forest	Bare ground-crop	Forest-Shrub	Oil palm	Built-up area	Water	**UA**
Forest	18974	619	674	647	0	0	**0.91**
Bare ground-Crop	385	13200	1533	855	403	58	**0.80**
Forest-Shrub-Mosaic	4527	735	3906	1474	17	0	**0.37**
Oil palm	2479	218	1408	6851	8	0	**0.62**
Built-up area	0	328	0	0	5934	103	**0.93**
Water	26	278	0	0	2	9860	**0.97**
PA	**0.72**	**0.86**	**0.52**	**0.70**	**0.93**	**0.98**	**OA= 0.78**

Supplementary Table 4. Error matrices for SAR classified image. PA = Producer's Accuracy, UA = User's Accuracy, OA = Overall Accuracy.

SAR	Forest	Bare ground-crop	Forest-Shrub	Oil palm	Built-up area	Water	**UA**
Forest	31085	93	4824	75	1542	53	**0.83**
Bare ground-Crop	23	16255	1424	2047	476	295	**0.79**
Forest-Shrub-Mosaic	5322	2509	2951	410	915	143	**0.24**
Oil palm	1018	2669	1463	11500	794	62	**0.66**
Built-up area	318	203	69	226	5503	257	**0.84**
Water	114	410	51	15	83	13619	**0.95**
PA	**0.82**	**0.73**	**0.27**	**0.81**	**0.59**	**0.94**	**OA=0.74**

Supplementary Table 5. Error matrices for Combined classified image. PA = Producer's Accuracy, UA = User's Accuracy, OA = Overall Accuracy.

Combined	Forest	Bare ground-crop	Forest-Shrub	Oil palm	Built-up area	Water	**UA**
Forest	19997	384	852	10	1	0	**0.94**
Bare ground-Crop	104	13990	1364	1126	156	84	**0.83**
Forest-Shrub-Mosaic	6107	527	4849	415	43	0	**0.41**
Oil palm	182	305	456	8276	9	0	**0.90**
Built-up area	0	116	0	0	6152	82	**0.97**
Water	1	56	0	0	3	9854	**0.99**
PA	**0.76**	**0.91**	**0.64**	**0.84**	**0.97**	**0.98**	**OA=0.84**

Supplementary Table 6. Identification reference of the 40 Landsat images used in the classification

LC08_L1TP_127059_20150106_20170415_01_T1
LC08_L1TP_127060_20150106_20170415_01_T1
LC08_L1TP_127060_20150122_20170413_01_T1
LC08_L1TP_127059_20150207_20170413_01_T1
LC08_L1TP_127059_20150223_20170412_01_T1
LC08_L1TP_127060_20150223_20170412_01_T1
LC08_L1TP_127059_20150311_20170412_01_T1
LC08_L1TP_127060_20150311_20170412_01_T1
LC08_L1TP_127059_20150327_20170411_01_T1
LC08_L1TP_127060_20150327_20170411_01_T1
LC08_L1TP_127059_20150412_20170410_01_T1
LC08_L1TP_127060_20150412_20170410_01_T1
LC08_L1TP_127059_20150428_20170409_01_T1
LC08_L1TP_127060_20150428_20170409_01_T1
LC08_L1TP_127059_20150514_20170409_01_T1
LC08_L1TP_127059_20150530_20170408_01_T1
LC08_L1TP_127060_20150530_20170408_01_T1
LC08_L1TP_127059_20150615_20170407_01_T1
LC08_L1TP_127060_20150615_20170407_01_T1
LC08_L1TP_127059_20150701_20170407_01_T1
LC08_L1TP_127060_20150701_20170407_01_T1
LC08_L1TP_127059_20150717_20170407_01_T1
LC08_L1TP_127060_20150717_20170407_01_T1
LC08_L1TP_127059_20150802_20170406_01_T1
LC08_L1TP_127060_20150802_20170406_01_T1
LC08_L1TP_127059_20150818_20170406_01_T1
LC08_L1TP_127060_20150818_20170406_01_T1
LC08_L1TP_127059_20150903_20170404_01_T1
LC08_L1TP_127060_20150903_20170404_01_T1

LC08_L1TP_127060_20150919_20170404_01_T1
LC08_L1TP_127059_20151005_20170403_01_T1
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LC08_L1TP_127059_20151021_20170403_01_T1
LC08_L1TP_127060_20151021_20170403_01_T1
LC08_L1TP_127060_20151106_20170402_01_T1
LC08_L1TP_127059_20151122_20170401_01_T1
LC08_L1TP_127060_20151122_20170401_01_T1
LC08_L1TP_127060_20151208_20170401_01_T1
LC08_L1TP_127059_20151224_20170331_01_T1
LC08_L1TP_127060_20151224_20170331_01_T1

Supplementary Table 7. Producer's (%) and User's (%) accuracy of Combined, Landsat and SAR land-cover maps classified with a Classification and Regression Tree (CART) algorithm. 'PA' refers to Producer's accuracy and 'UA' refers to User's accuracy. Values in bold represents the highest producer's and user's accuracy for oil palm land-cover and highest overall accuracy.

Land-cover class		**Combined**	**Landsat**	**SAR**
Oil Palm	*PA*	**87%**	53%	64%
	UA	**89%**	66%	76%
Forest	*PA*	61%	56%	58%
	UA	73%	60%	64%
Forest Shrub Mosaic	*PA*	46%	37%	26%
	UA	39%	30%	25%
Bare Ground Crop	*PA*	75%	66%	53%
	UA	65%	55%	39%
Built-up Area	*PA*	97%	94%	67%
	UA	94%	88%	58%
Water	*PA*	98%	98%	94%
	UA	99%	99%	95%
	Overall Accuracy	**77%**	66%	62%