

Indonesia 2050PC Land Use Modelling

Taipei, 11th February 2015
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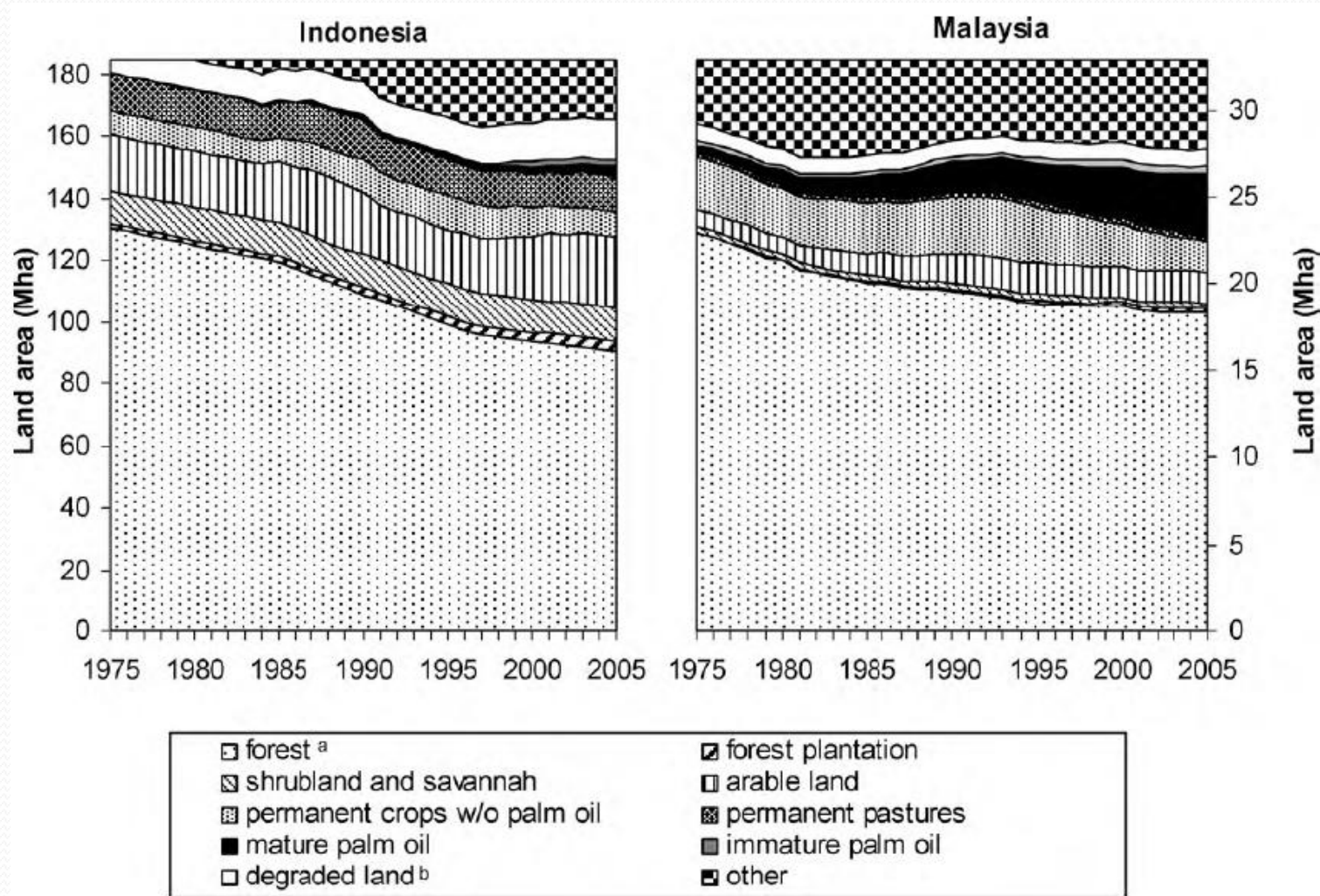
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Indonesian Intricacies (1)

- Developing country
- Highly diverse archipelago
- Dietary differences
- Pastoral preferences

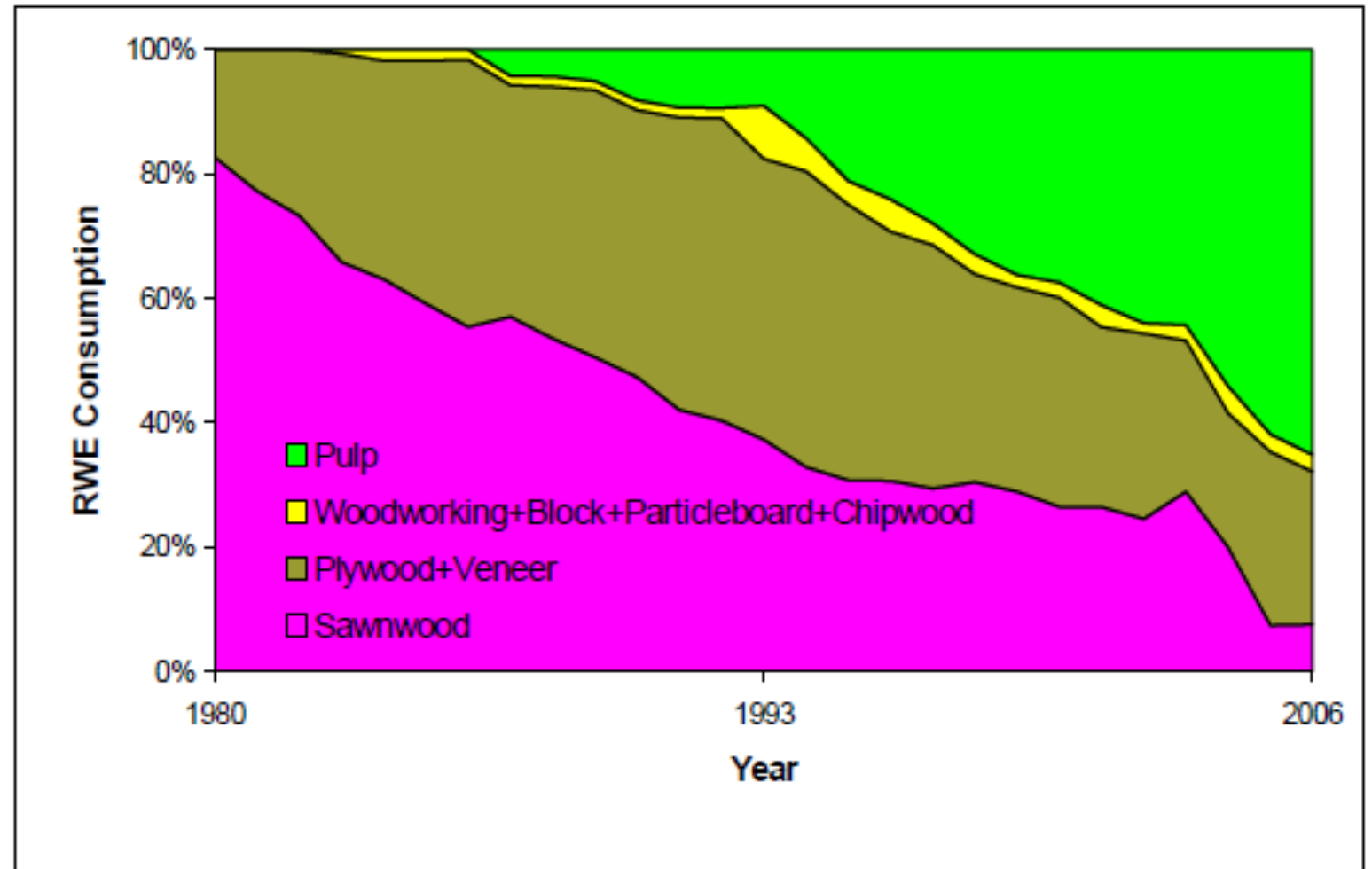
Indonesian Intricacies (2): Land Use



Source: Wicke et al 2011

Indonesian Intricacies (3): Wood Industry

This trend towards pulp corresponds with international wood demand



Source: CFPS (2009)

Indonesian Intricacies (4): Farm Factors

- Very little red meat consumption (around 2 calories per person per day based on a 1900 calories diet); ~50% of calories consumed comes from rice and ~10% from plant oils
- Imports most of its meat in regards to bovine consumption
- Polyculture - *tumpang sari*

Tabel 3.3 Rata-Rata Konsumsi Kalori (kkal) dan Protein (gram) per Kapita Sehari Beberapa Jenis Makanan, 2010 dan 2011
Table 3.3 Daily Average Consumption of Calorie (Kcal) and Protein (Grams) per Capita for Several Foods, 2010 and 2011

Jenis Makanan Food Items	Kalori / Calorie		Protein / Protein	
	2010	2011	2010	2011
(1)	(2)	(3)	(4)	(5)
1. Beras lokal/ketan - Local rice/sticky rice	894.82	890.32	20.94	20.83
2. Jagung basah dengan kulit - Fresh corn with husk	0.93	0.60	0.03	0.02
3. Jagung pocielan/pipilan - Dry shelled corn	13.59	10.33	0.35	0.27
4. Ketela pohon - Cassava	18.17	20.80	0.12	0.14
5. Ketela rambat - Sweet potatoes	7.96	9.81	0.07	0.09
6. Gaplek - Dried cassava	0.37	1.20	0.00	0.01
7. Ikan dan udang segar - Fresh fish and shrimp	30.82	31.84	5.26	5.42
8. Ikan dan udang diawetkan - Canned fish and shrimp	14.35	15.99	2.33	2.61
9. Daging sapi/kerbau - Cow buffalo meat				
10. Daging ayam ras/kampung-Broiler/local chicken meat	2.13	2.45	0.20	0.23
11. Telur ayam ras/kampung - Chicken egg	34.15	35.60	2.06	2.15
12. Telur itik/manila/asin - Duck/salted egg	25.96	25.49	2.08	2.04
13. Susu kental manis - Canned liquid milk	1.33	1.39	0.09	0.09
14. Susu bubuk bayi - baby powder milk	12.22	11.95	0.30	0.29
15. Bawang merah - Onion	5.38	16.18	0.24	0.76
16. Bawang putih - Garlic	2.43	2.27	0.09	0.09
17. Cabe merah - Chillies	3.10	3.09	0.15	0.15
18. Cabe rawit - Cayenne pepper	1.11	1.08	0.04	0.03
19. Kacang kedelai - Soybean	3.10	2.90	0.14	0.13
20. Tahu - Soybean curd	0.39	0.51	0.04	0.05
21. Tempe - Fermented soybean cake	15.31	16.17	2.09	2.20
22. Minyak kelapa/jagung/goreng lainnya Coconut/maize/other frying oil	27.24 198.97	28.65 199.84	2.29 0.05	2.40 0.04
23. Kelapa - Coconut				
24. Gula pasir - Sugar	30.33	27.33	0.29	0.26
25. Gula merah - Brown sugar dishes served together	76.69 7.66	73.63 7.46	0.00 0.06	0.00 0.06

Sumber: BPS, Susenas Panel 2010 dan Susenas 2011 Triwulan I
Source: BPS, Panel Susenas 2010 and Triwulan I Susenas 2011

Source: BPS (2011)

Modelling Methodology

Land use is divided into 4 major drivers: agriculture, palm oil, forestry, and critical land utilization

- Agriculture is divided into 5 levers: food demand, food crop productivity, food crop land use, other agricultural productivity, and other agricultural land use
- Palm oil is divided into 2 levers: land area usage and productivity
- Forestry has one lever representing potential changes in tenure assignment and area required
- Critical land utilization has one lever representing possible utilization levels in the future

Challenges

- Political processes
- Data availability
- Data quality

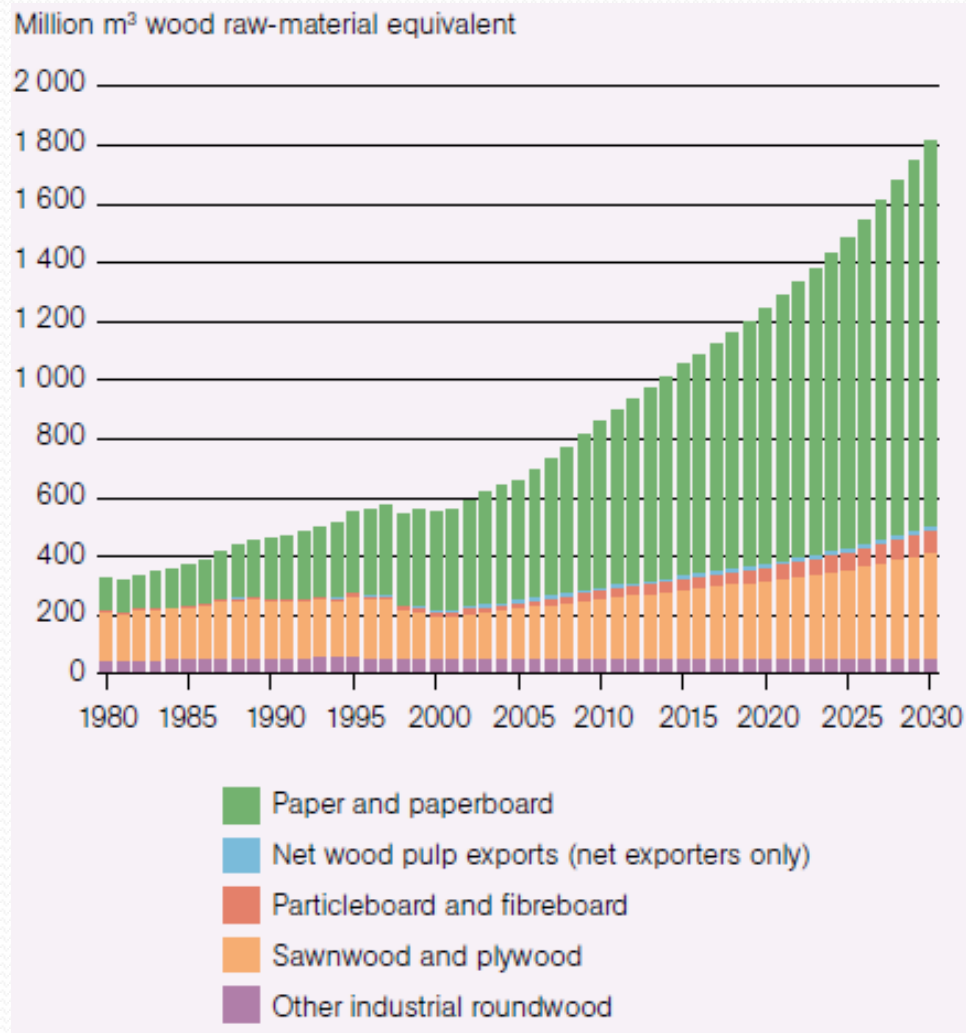
References

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Thank You

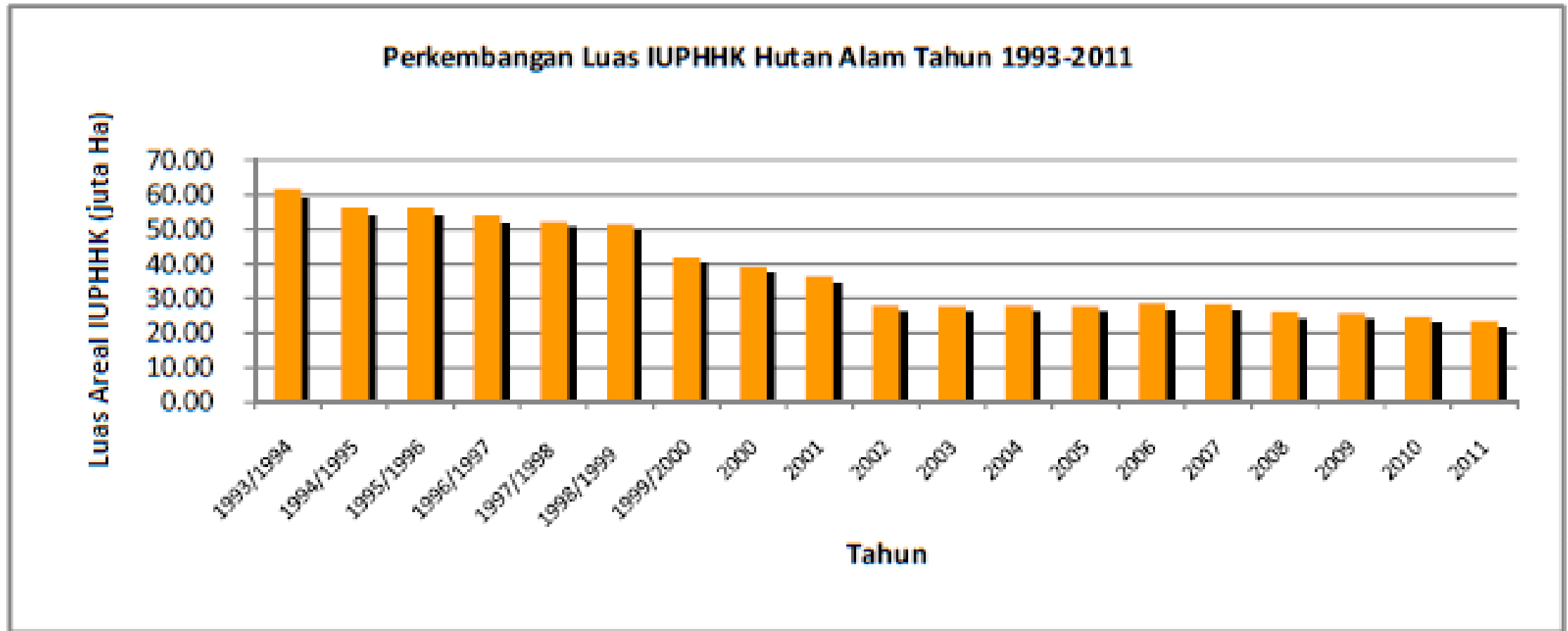
International Wood Demand



Demand for pulp outstrips others

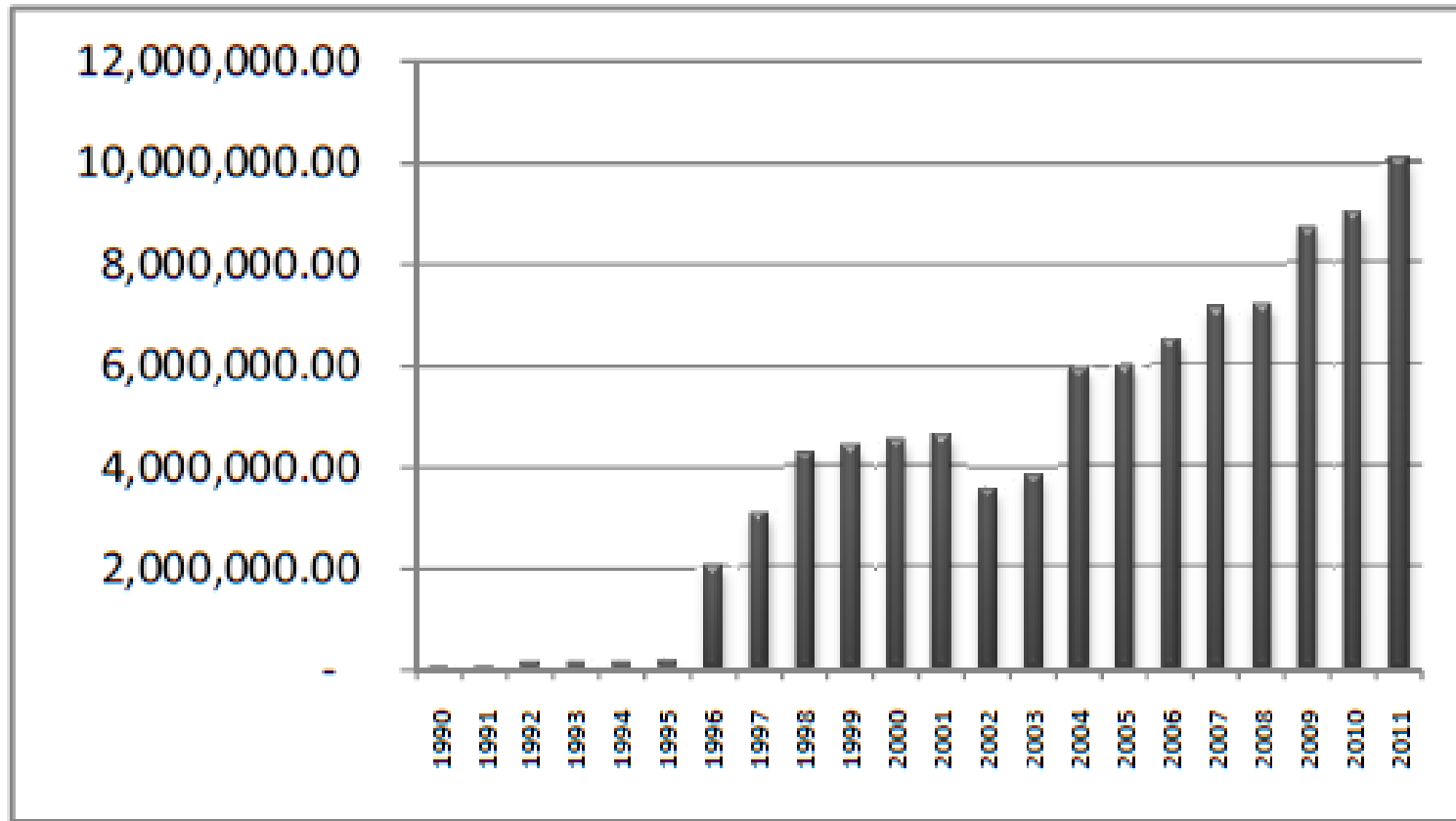
Source: FAO (2009)

Indonesian Natural Forest Concessions

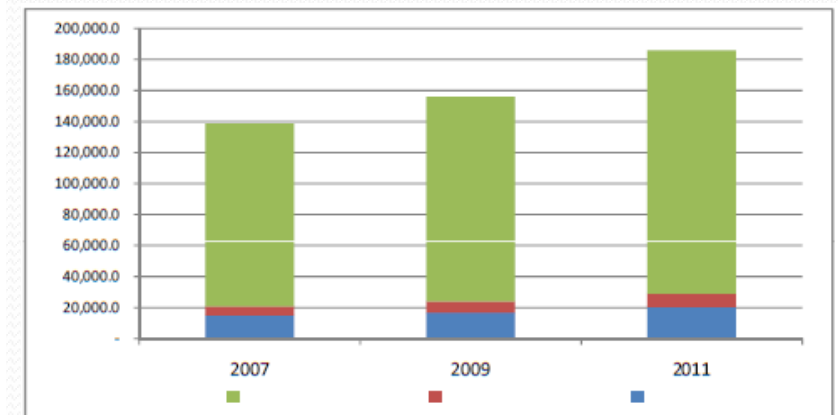


Source: Kementerian Kehutanan (2012)

Indonesian Forest Plantations

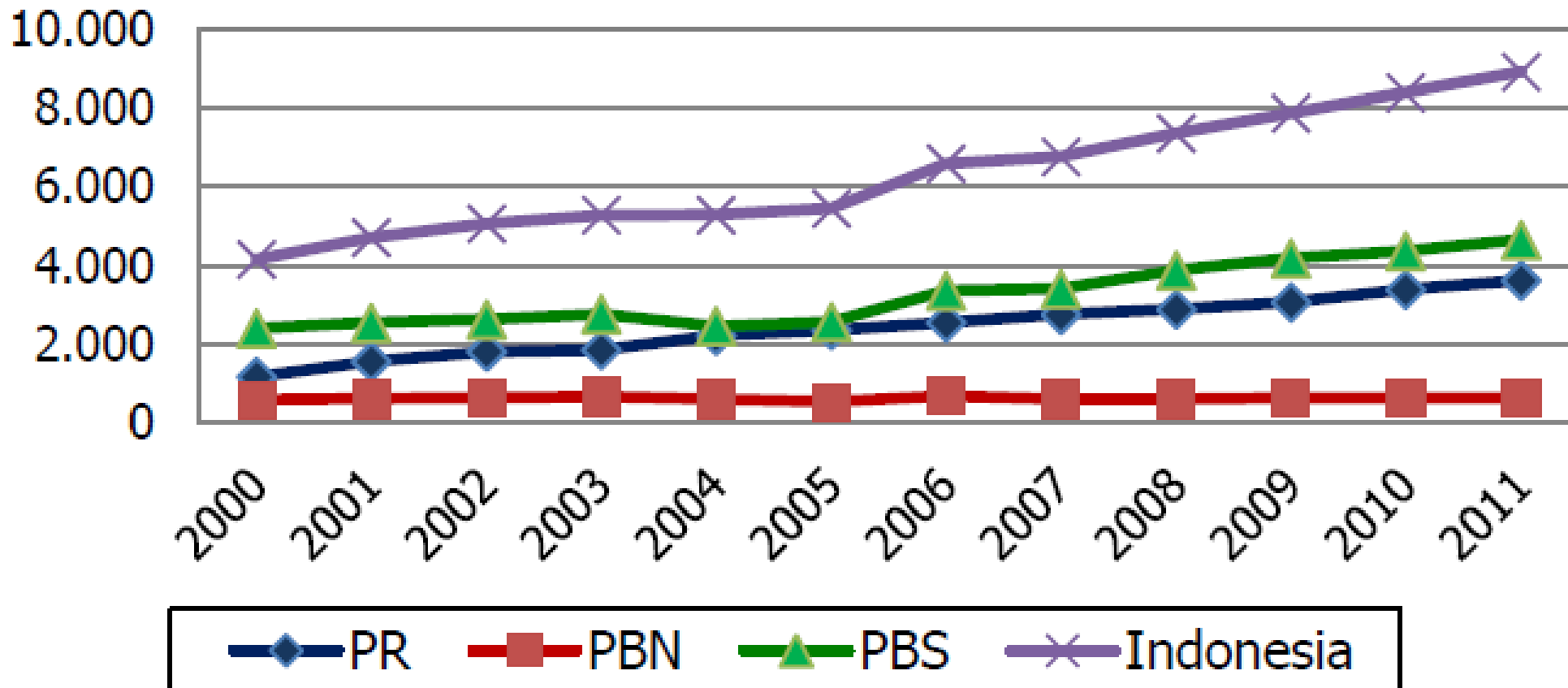


What does the future hold for Indonesian forest plantations?

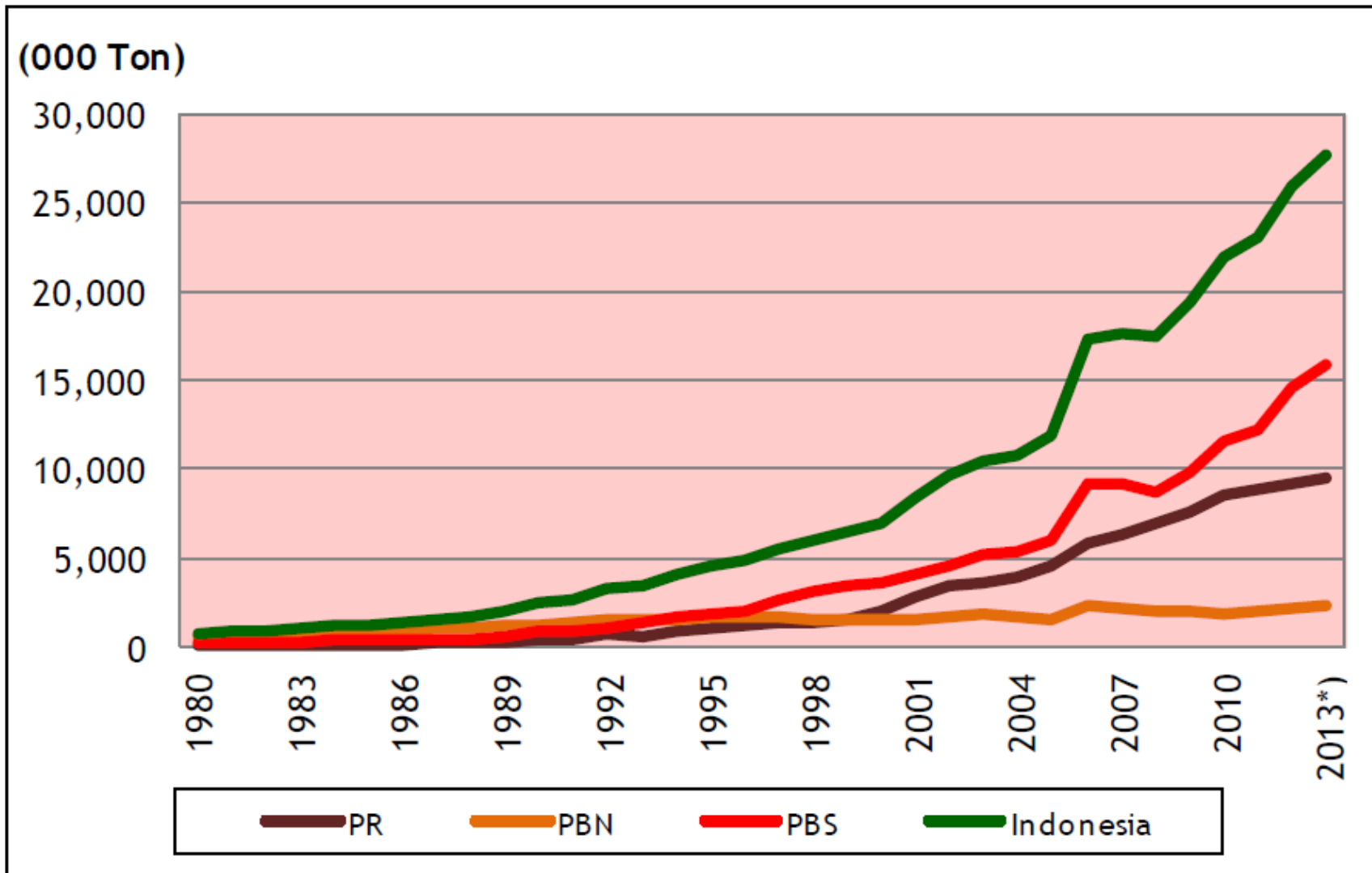


Indonesian Palm Oil Land Usage

(000 ha)



Indonesian Palm Oil Production



Source: PUSDATIN 2014

Modelling Example (1): Assumptions

	Area HPH	Area HTI	AGC HL	AGC HPH	AGC HTI
	(ha)		(ton carbon/ha)		
Lv 1	25.8	11.3	300	150	35
Lv 2	23.5	10.3	300	163	40
Lv 3	17.5	11.3	300	180	60
Lv 4	11.75	12.3	300	250	70

Source: Agus et al (2013)

Modelling Example (2): Forestry Results

Lv 2 = BAU	Area Changes	Management Changes	Combined
	(million tonnes COe)		
Lv 1	575.1	357	967
Lv 2	0	0	0
Lv 3	-562	-605.5	-1085.5
Lv 4	-1089.75	-2353.5	-2481

Modelling example (3): Palm Oil Results

		1	2	3	4
		33	30	25	15
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1	3.5	80.85	73.5	61.25	36.75
2	3.8	87.78	79.8	66.5	39.9
3	4.4	101.64	92.4	77	46.2
4	6.5	150.15	136.5	113.75	68.25