DECARBONIZING AFOLU SECTOR TOWARD LOW CARBON SOCIETY IN INDONESIA

Presented at 21st AIM International Workshop, 13-14 Novermber 2015

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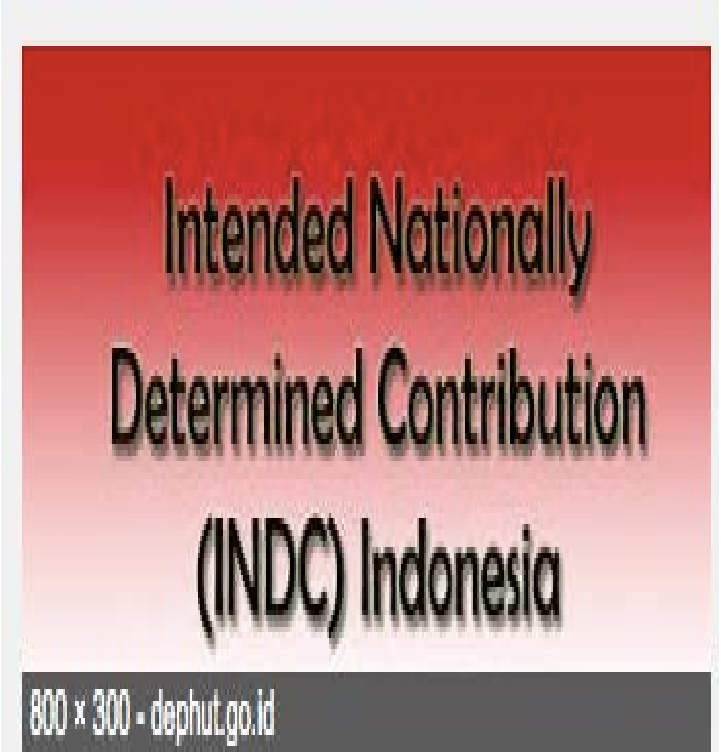
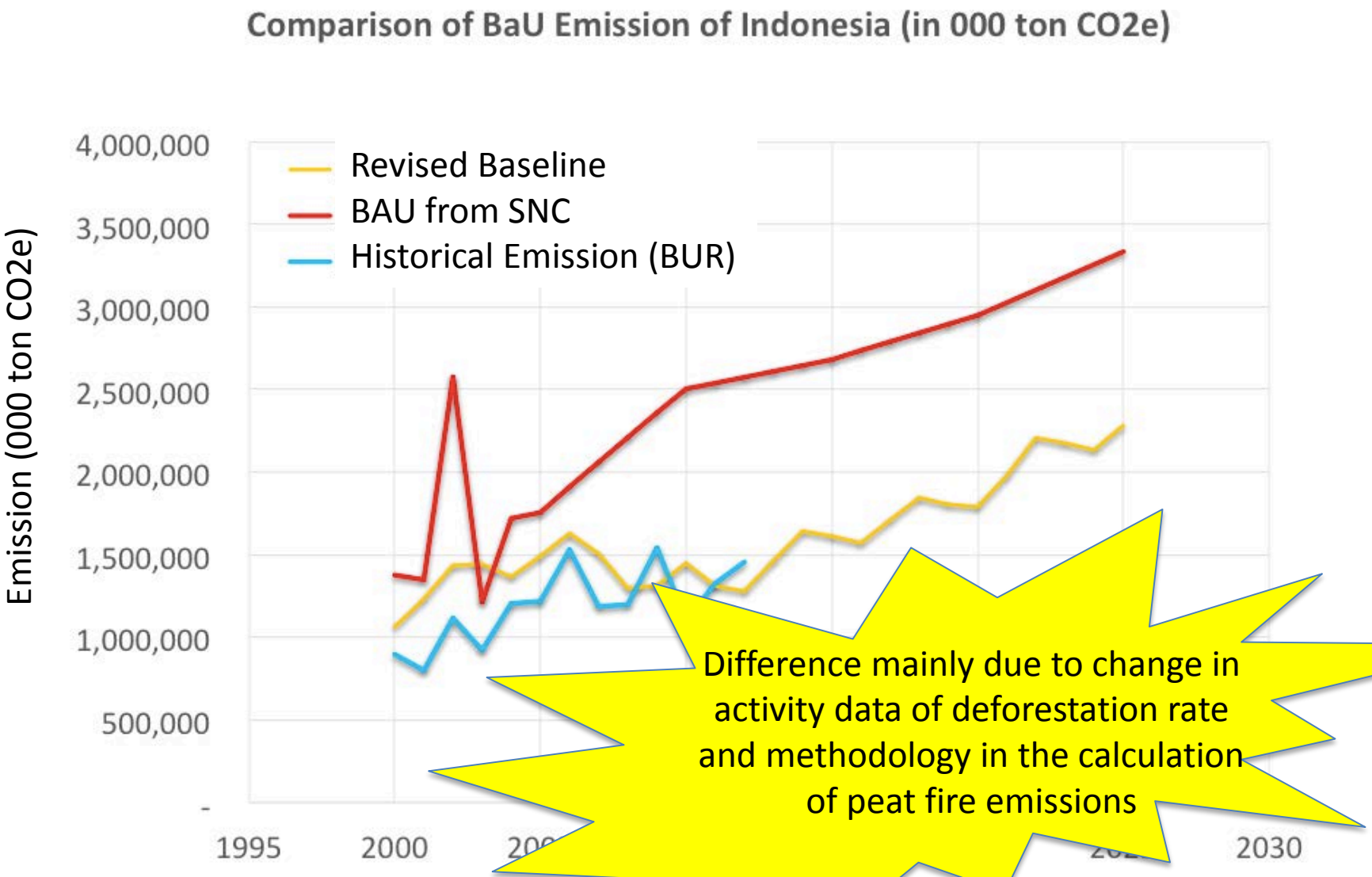
Introduction

- Indonesia has submitted its INDC to UNFCCC
- Indonesia has targeted to reduce its emission by 29% from the BAU emission in 2030
- Projection of BAU emission has been revised



Revised of Baseline Emission of Indonesia



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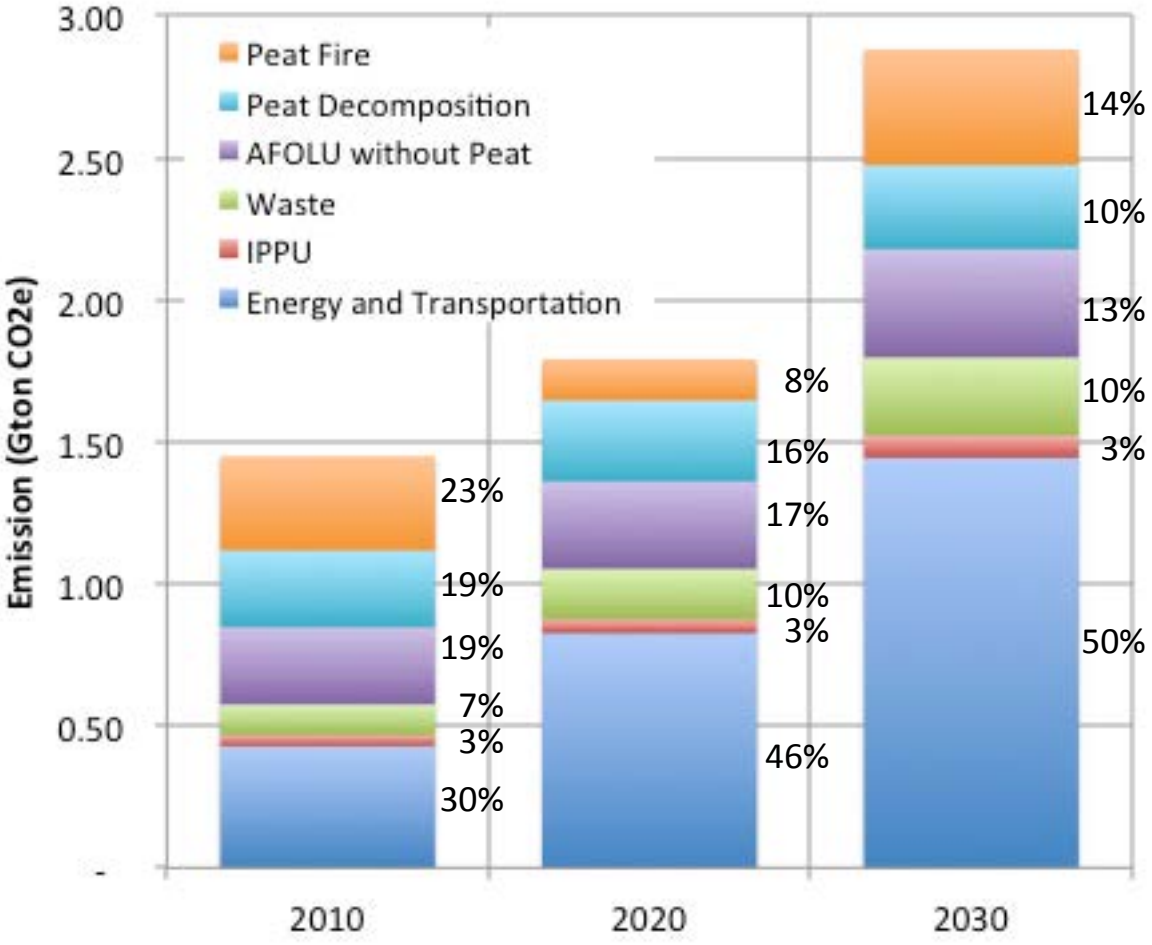
Revised BAU Emission (Indonesian INDC)

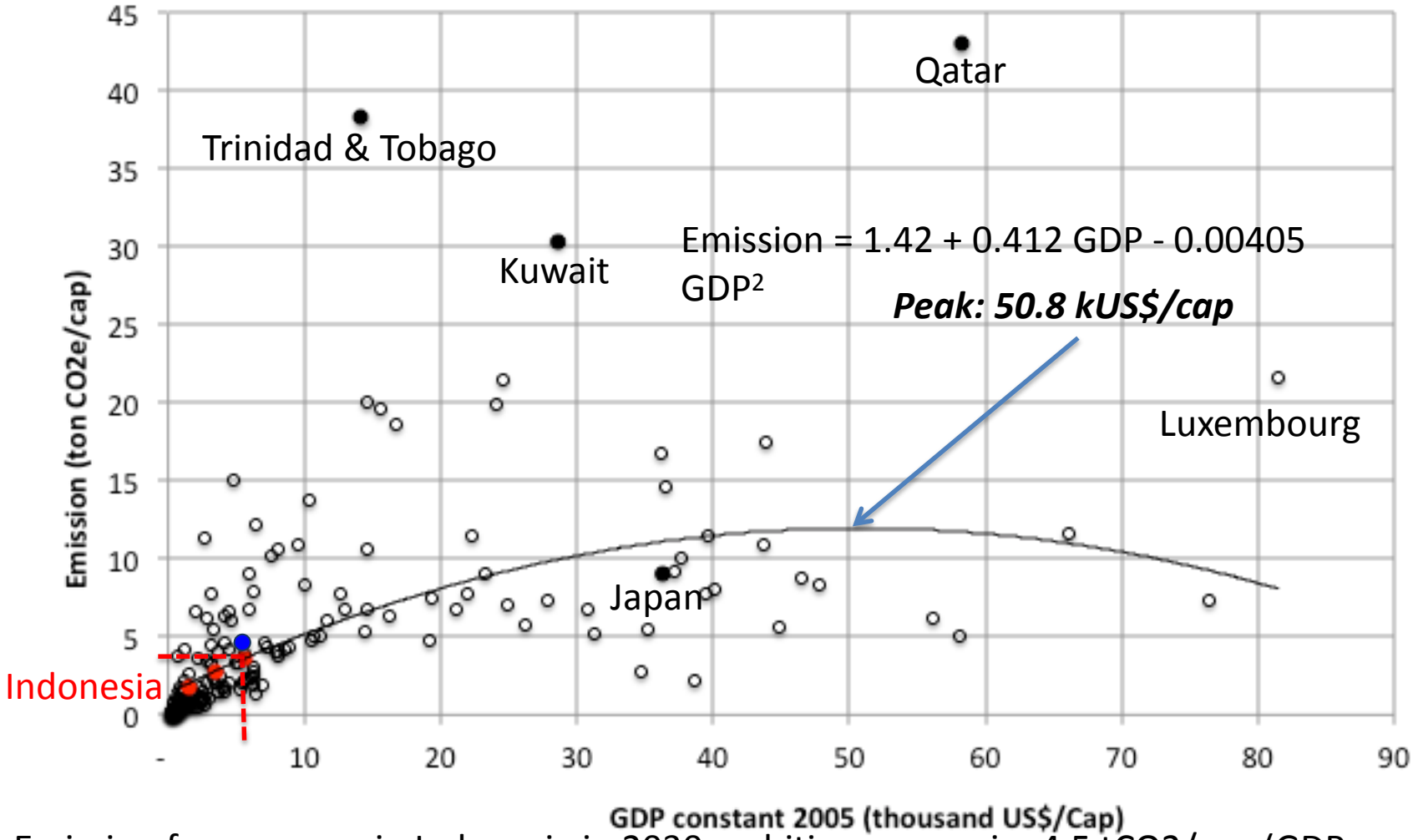


Sectors	Emission Growth (%/yr)	
	2010-'20	2010-'30
Energy and Transportation	9.3	11.9
IPPU	2.7	5.3
Waste	6.4	7.7
AFOLU without Peat	1.3	2.0
Peat Decomposition	0.5	0.5
Peat Fire	-5.6	1.1

Bappenas, 2015

Energy	1.83	3.15	5.16	t CO2/cap
Non-Energy	4.36	3.68	5.13	t CO2/cap
Total	6.19	6.84	10.29	t CO2/cap

Relationship between GDP and Emission per Capita (based on CAIT)

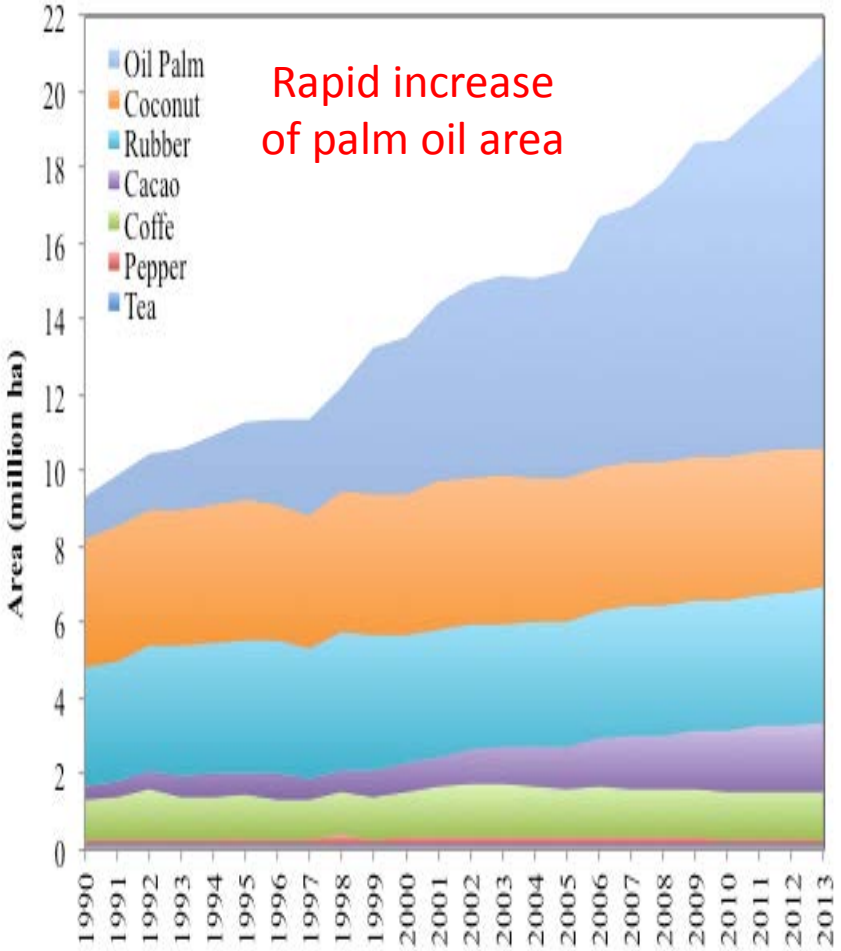


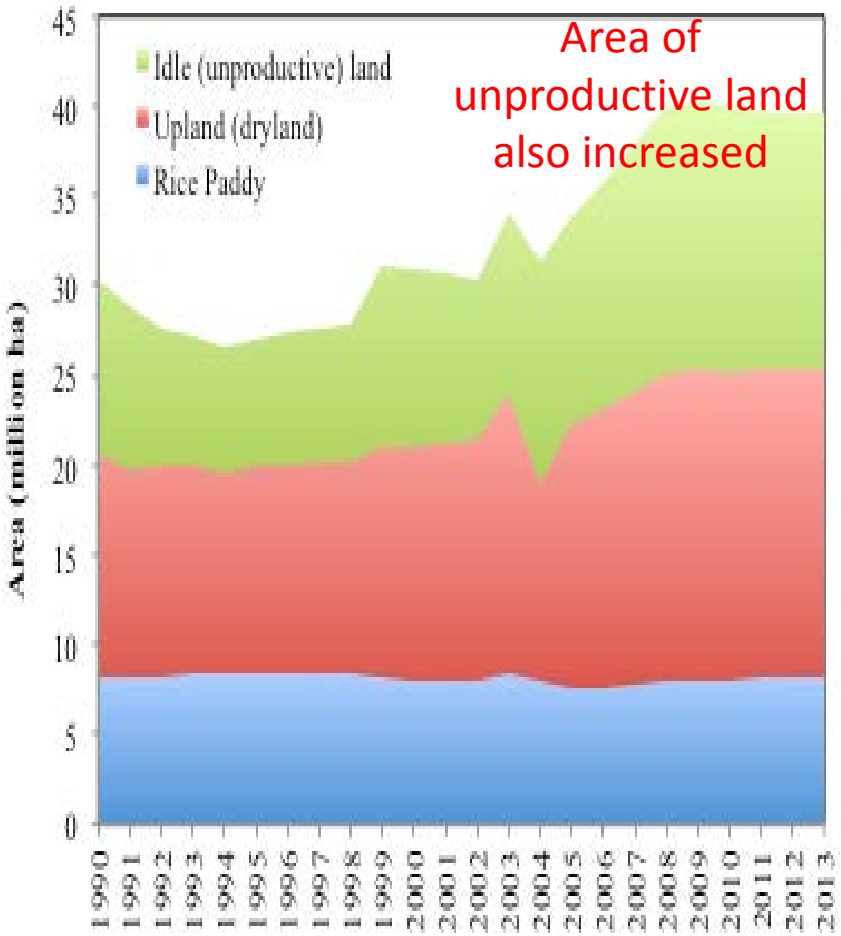
Emission from energy in Indonesia in 2030 ambitious scenario: 4.5 tCO2/cap (GDP Indonesia is estimated to be about **5,680** USD/cap

Objectives

- To assess the feasibility for AFOLU sector to take a pathway that will lead to deep decarbonization (i.e. per capita yearly emission of around 1.6 ton CO2 by 2050 ~ at present around 5.2 ton CO2), taking into account national socio-economic conditions, development aspirations, and other relevant factors

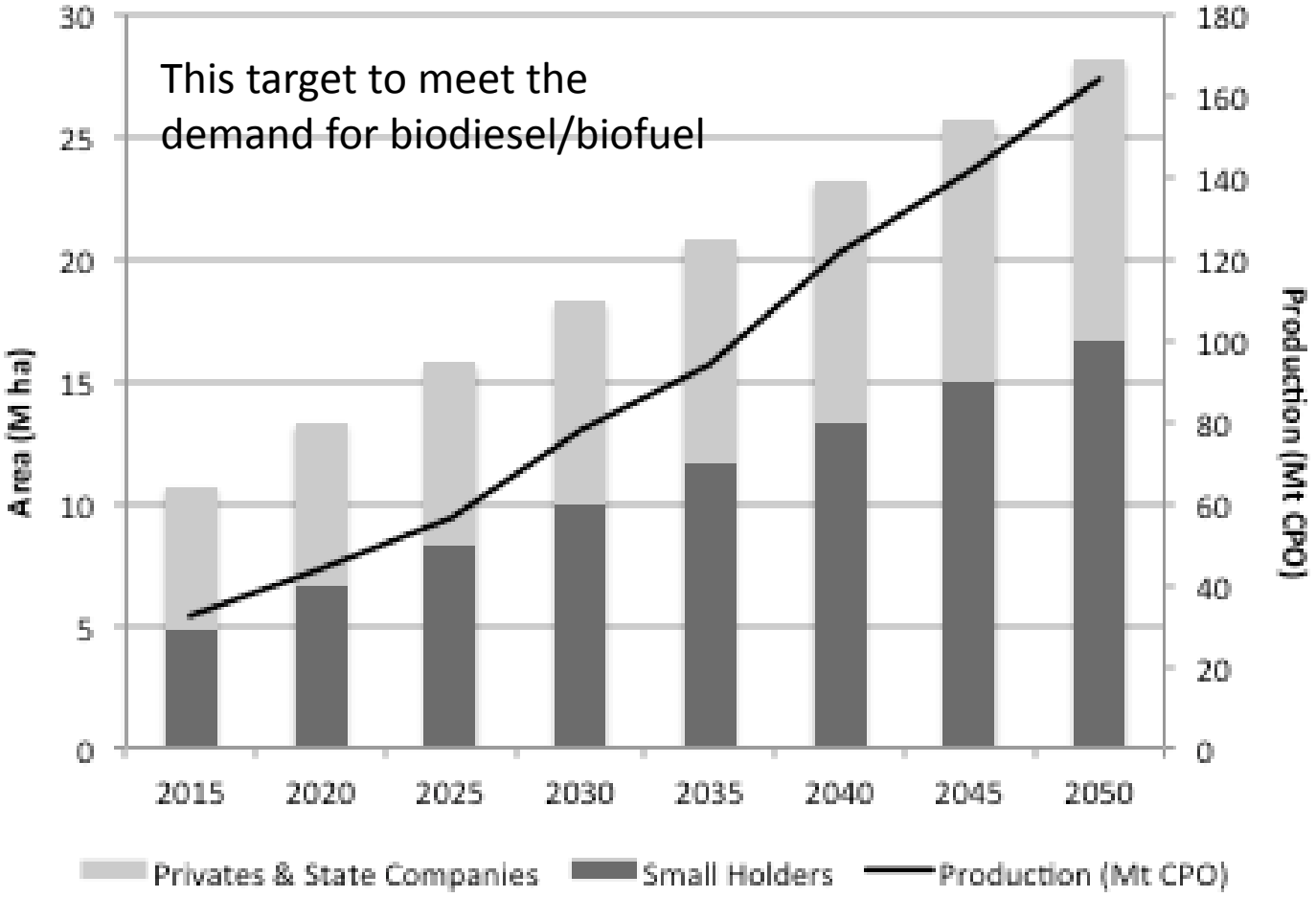
The growth of land area by commodities from 1990-2013





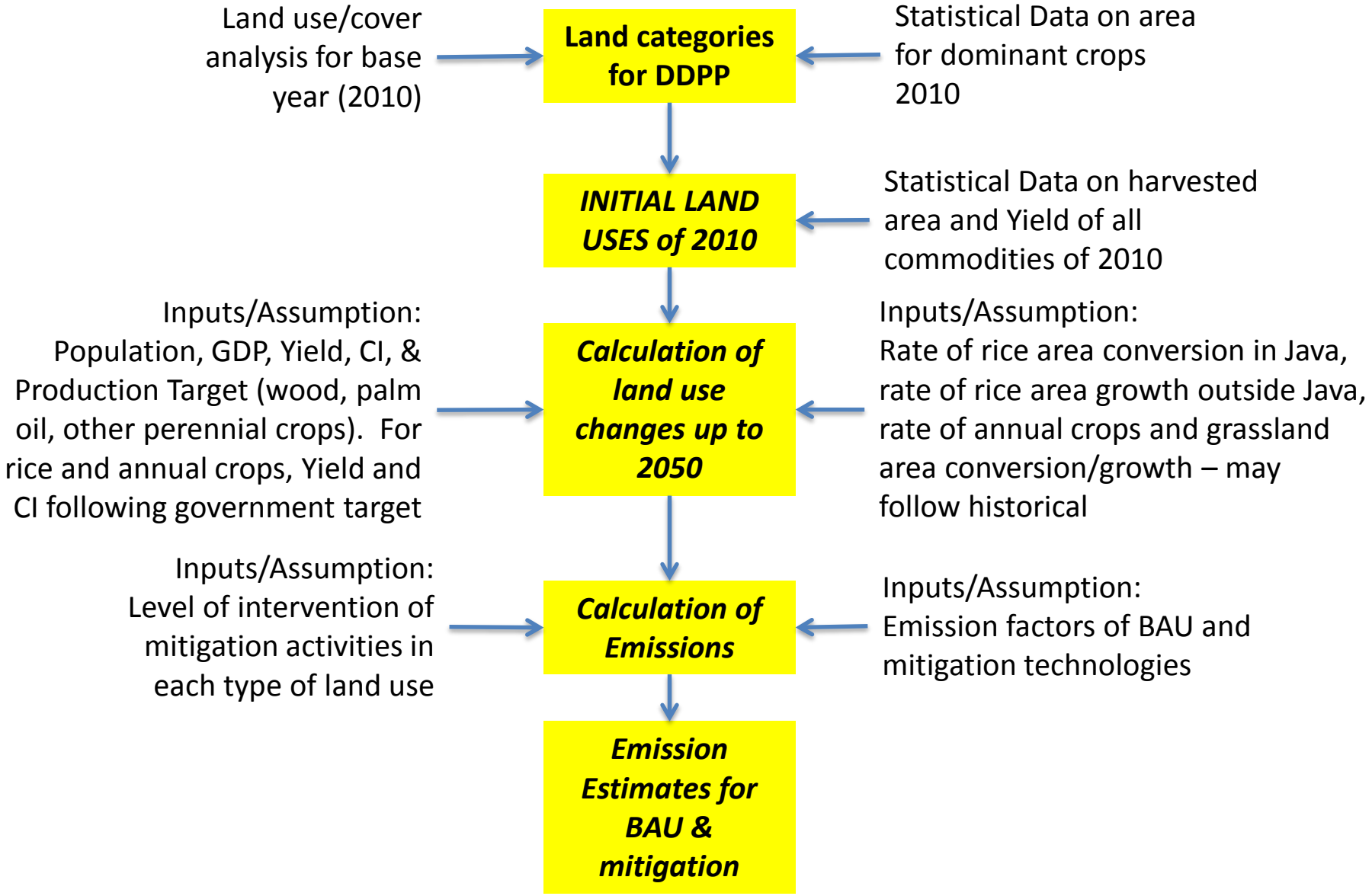
Source: BPS

Ambitious Target of Palm Oil Production (GAPKI, 2014)



Target of wood production based on RKTN (MoF, 2011) also high 360 million m^3 mainly from HTI (~15 Million ha)

Methodology: Framework of Dashboard for AFOLU



Development Scenarios

- BAU: Historical
- Government: Following development plan and target
- Deep Decarbonization: Following development plan and target with improved system and intensified mitigation actions
- For all scenarios, it is set to
  - Keep rice to be self sufficient
  - Land demand for livestock is meet
  - Land demand for settlement is meet
  - Meet the target of production for palm oil and wood (For palm oil, follow the GAPKI scenario and for wood based on RKTN, i.e. 360 million m^3 by 2030; MoF 2011)

Assumptions

	Unit	2010	2020	2030	2040	2050
Population	Million	234	262	280	299	307
Per capita GDP	USD	2,306	3,454	5,680	9,086	14,974
Dairy Cattle	000 head	366	390	415	441	469
Other Cattle	000 head	9,727	10,107	10,502	10,912	11,338
Buffolo	000 head	1,440	1,496	1,554	1,615	1,678
Sheep	000 head	10,725	11,144	11,580	12,032	12,502
Goat	000 head	16,620	17,269	17,943	18,644	19,372
Horse	000 head	419	435	452	470	488
Swine	000 head	7,477	7,769	8,073	8,389	8,717
Native Chicken	000 head	84,672	87,979	91,416	94,987	98,697
Egg chicken/Layer	000 head	105,210	109,320	113,590	118,026	122,637
Broiler	000 head	162,225	168,562	175,146	181,988	189,096
Duck	000 head	44,302	46,035	47,835	49,706	51,650

Assumption for Crop Productivity

	2010	2050	2050	2050
		BAU	GOV	DDPP
Rice in Java	5.80	5.95	6.11	6.11
Outside Java	4.20	5.20	5.20	5.20
Upland rice	3.04	3.04	3.04	3.04
other serials	4.44	5.00	6.00	7.00
vegetables	9.03	10.00	11.00	12.00
oil crop	5.27	7.00	7.00	7.00
other crop	0.87	1.30	1.30	1.30
casava	20.22	26.41	29.99	35.00
sugar crop	47.89	66.53	77.64	80.00
fruits and nuts	10.71	12.01	13.01	14.00
industrial crop	0.85	1.20	1.31	1.40
palmoil (FB)	23.17	27.18	30.02	34.50
Assumption land productivity for feed production Nat/Cul (kg/m^2)	0.5/5	0.5/5	0.5/5	0.5/5

Assumption for Consumption

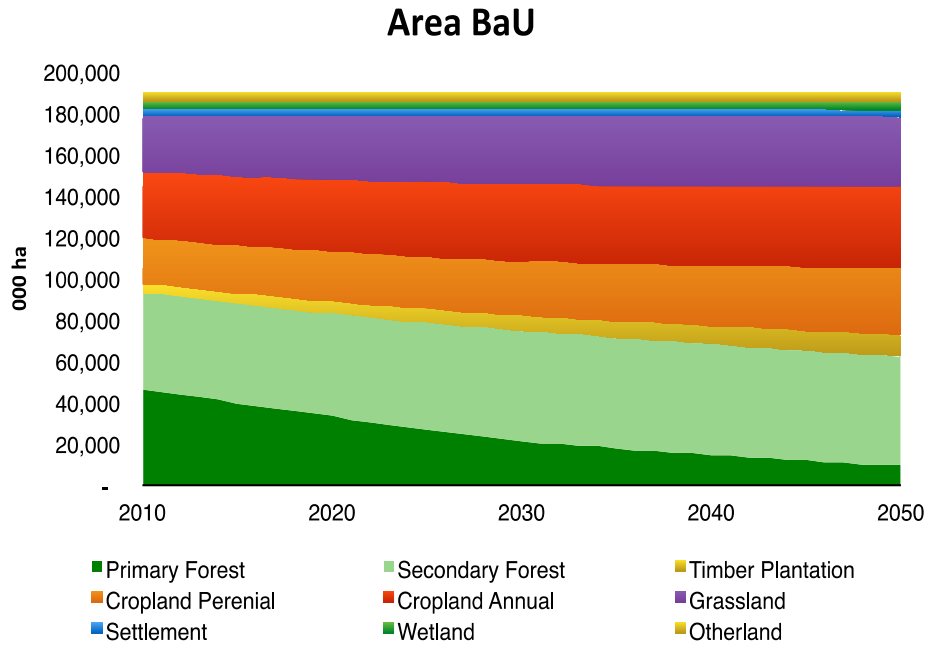
		BAU	GOV	DDPP
Consumption (kg/cap/yr)	**2010**	**2050**	**2050**	**2050**
Rice crops	141.00	127.75	127.75	115.55
Other Cerals	85.00	94.00	103.00	103.00
Vegetables	56.00	68.00	68.00	68.00
Oil Crops	65.00	79.00	79.00	79.00
Other Crop	14.00	16.00	16.00	16.00
Cassava	60.00	78.00	78.00	78.00
Sugar Crops	147.00	267.00	267 .00	267.00
Fruits and Nuts	80.33	98.07	98.07	98.07
Palm Oil	4.29	5.23	5.23	5.23
Per capita Settlement space (m2/cap)	109.38	109.38	73.13	73.17

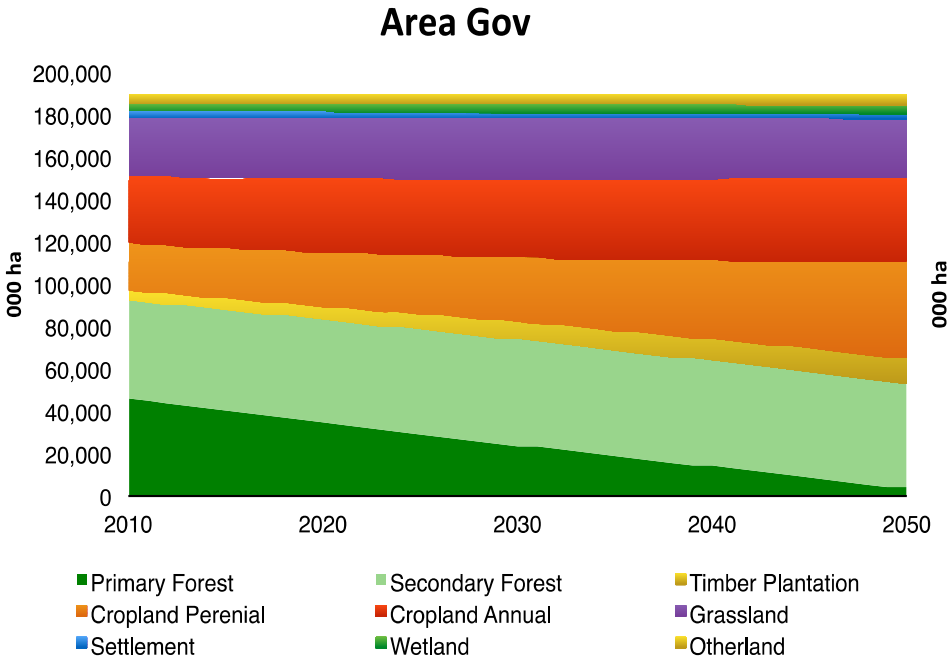
Assumption for future deforestation

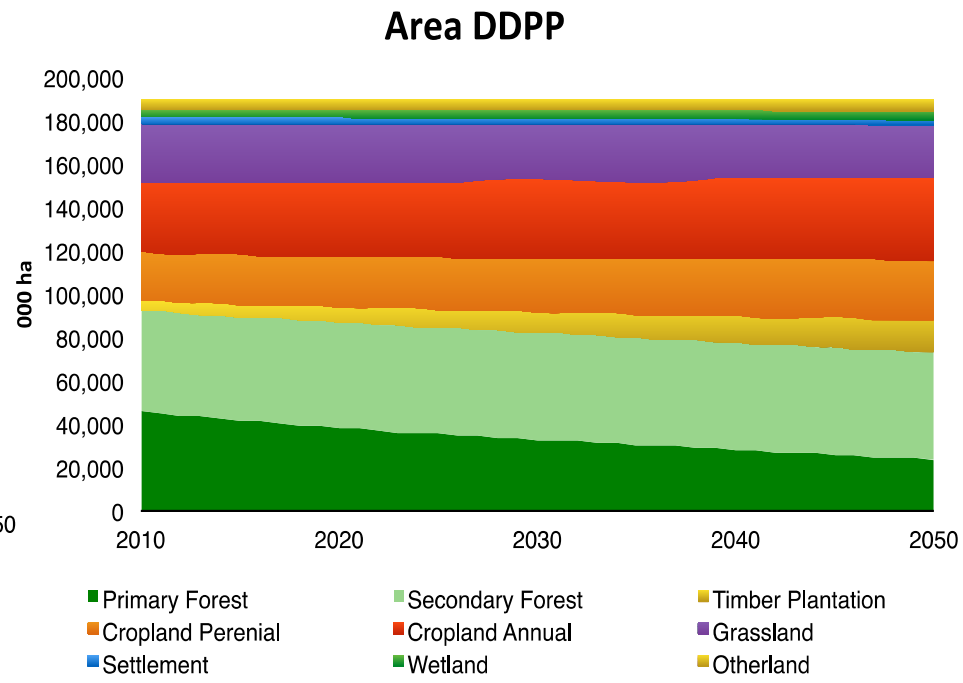
	BAU	GOV	DDPP
Deforesta n Rate	2.1%	1.3%	0.8%
Input avera Defo		313	267
Output Def	755	913	416
Rice	.594	-22.710	-27.594
Rice a/yr)	28.764	128.218	28.764

Deforestation rate suggested by the model is higher than the assumption rates. Land allocation to meet the target defined in the three scenarios are not enough

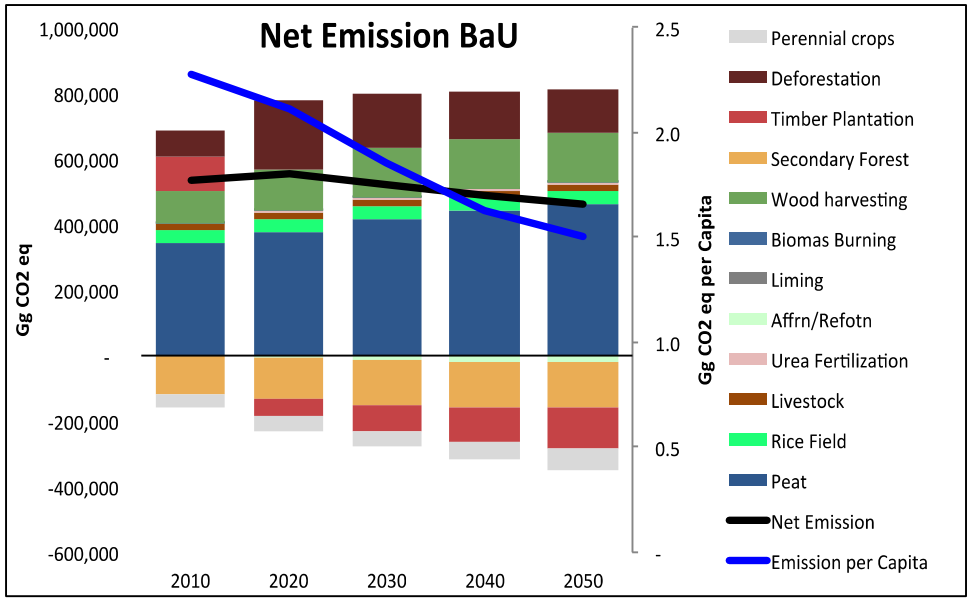
Land Use Projection under the Three scenarios of Development

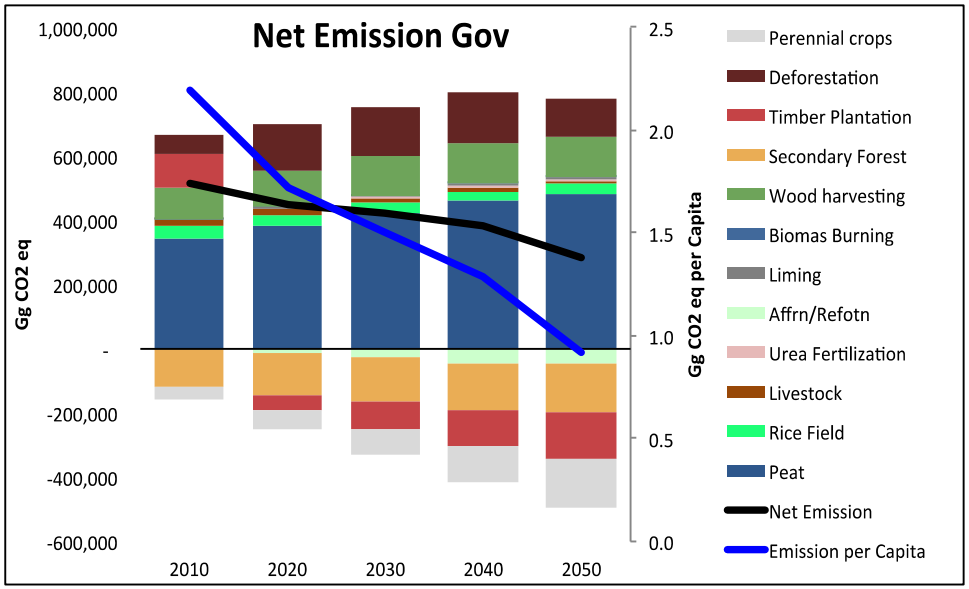


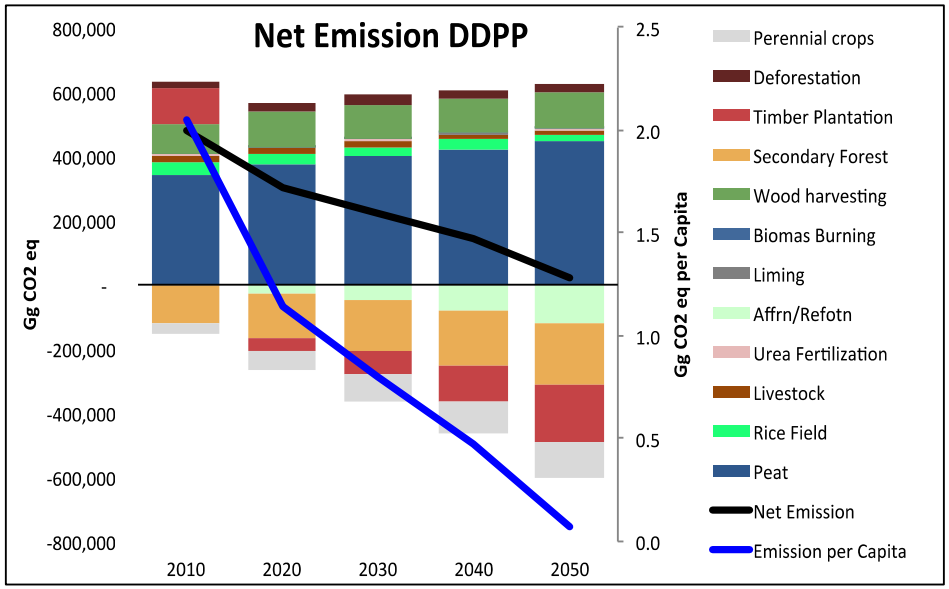




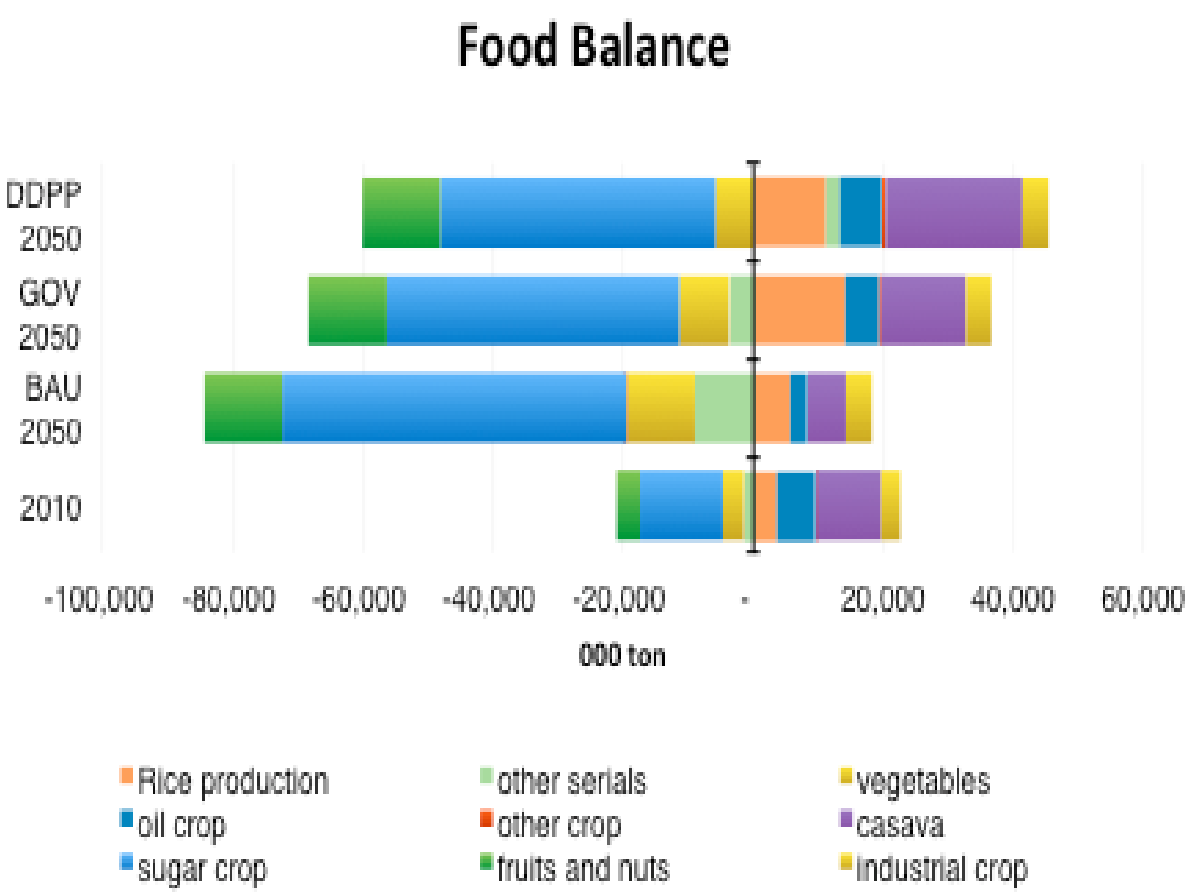
Emission Projection under the three scenarios

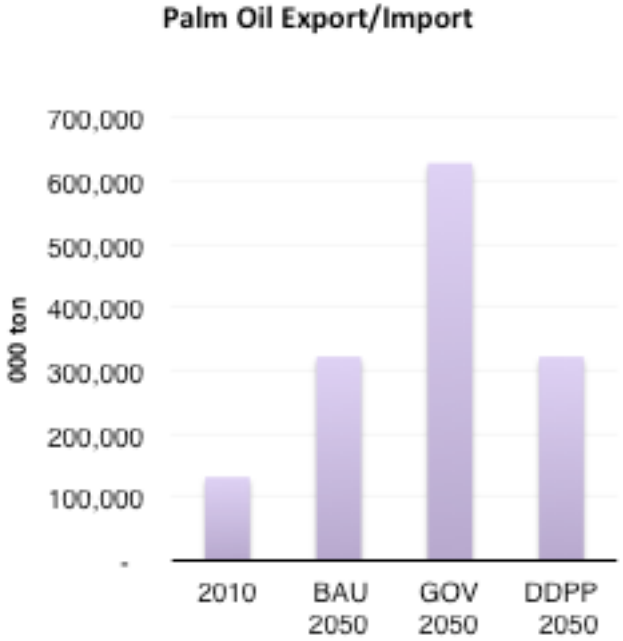






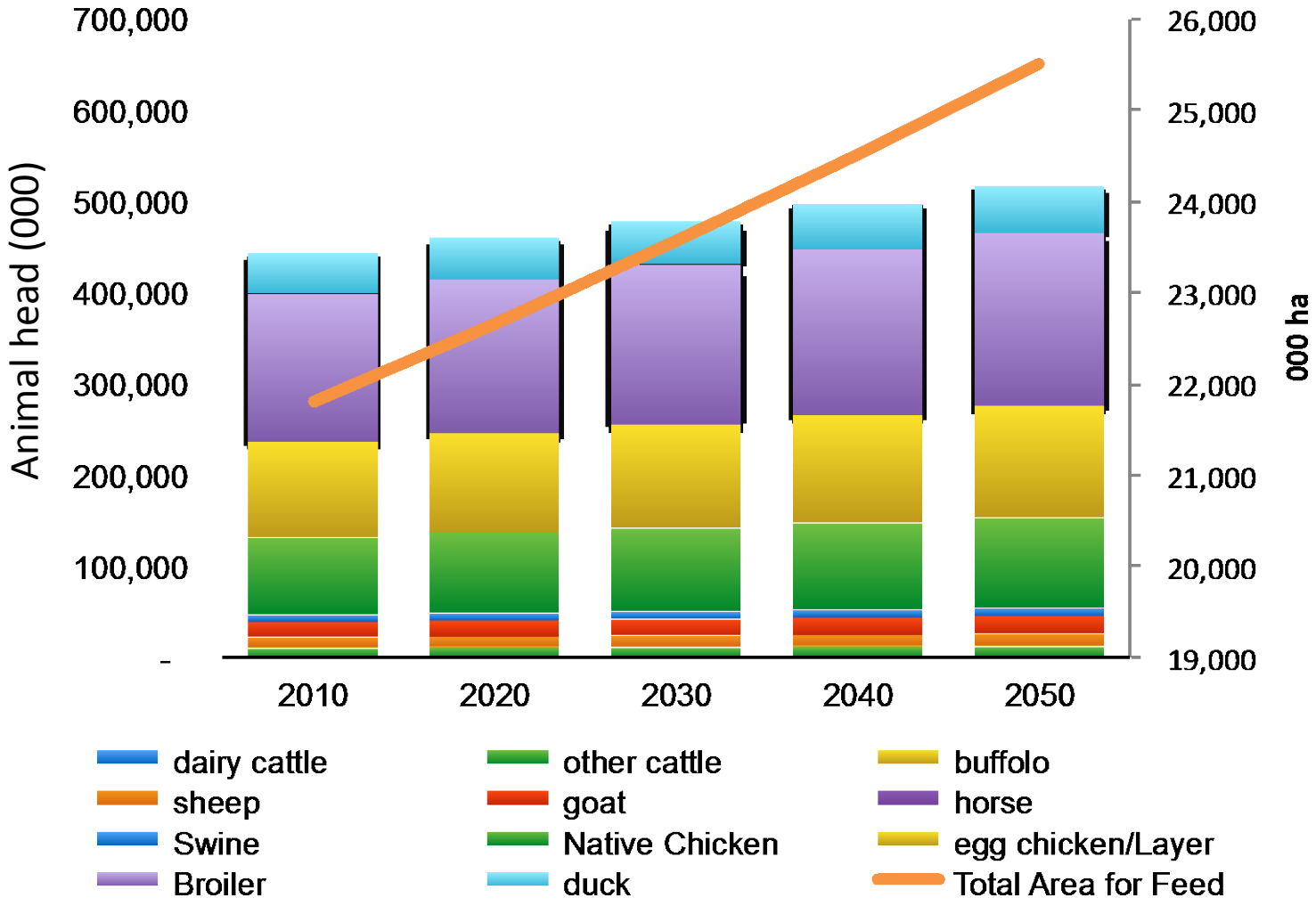
Food Balance and Palm Oil Export



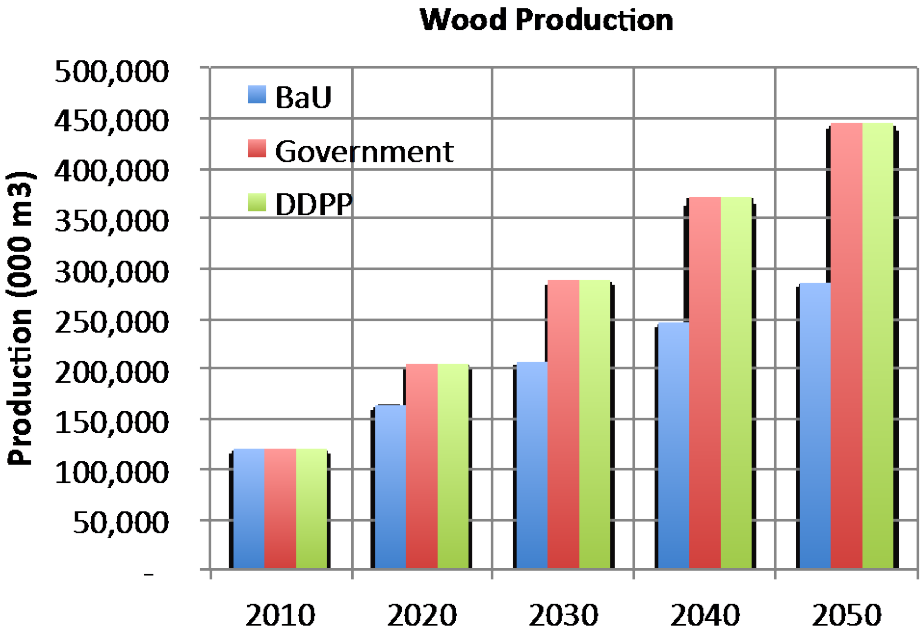


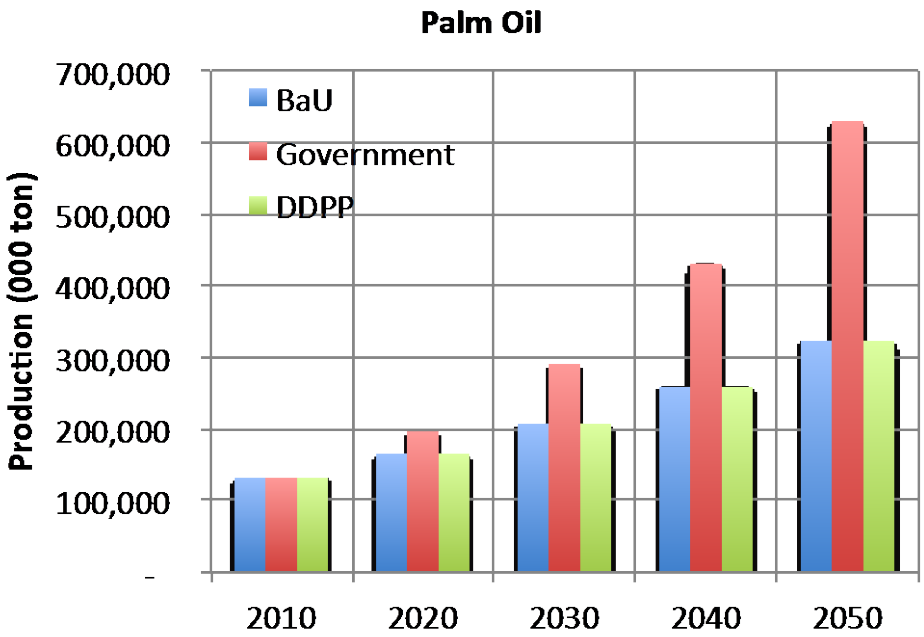
Production surplus after deducted with consumption (excluded biofuel)

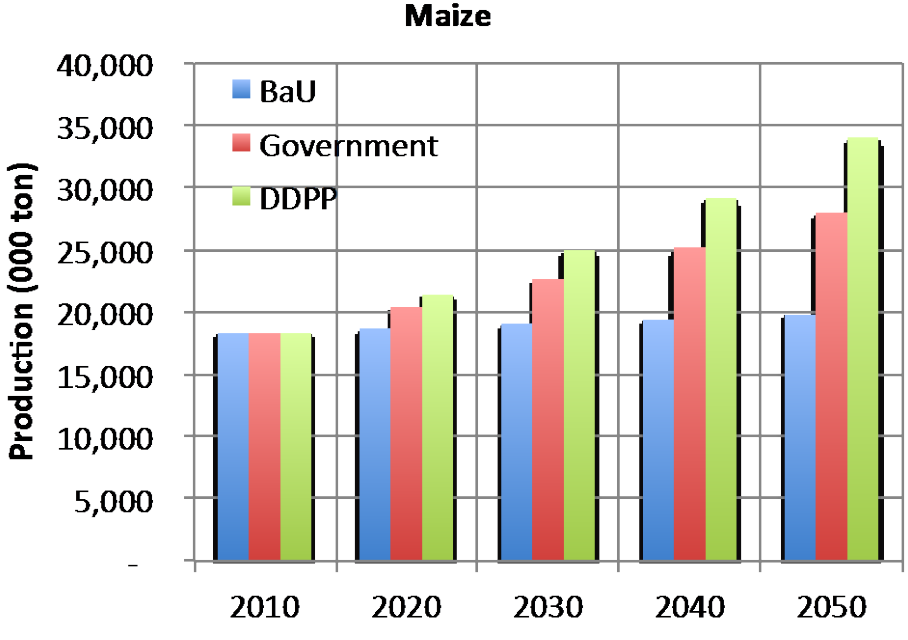
Animal Head and Area for Feed BaU

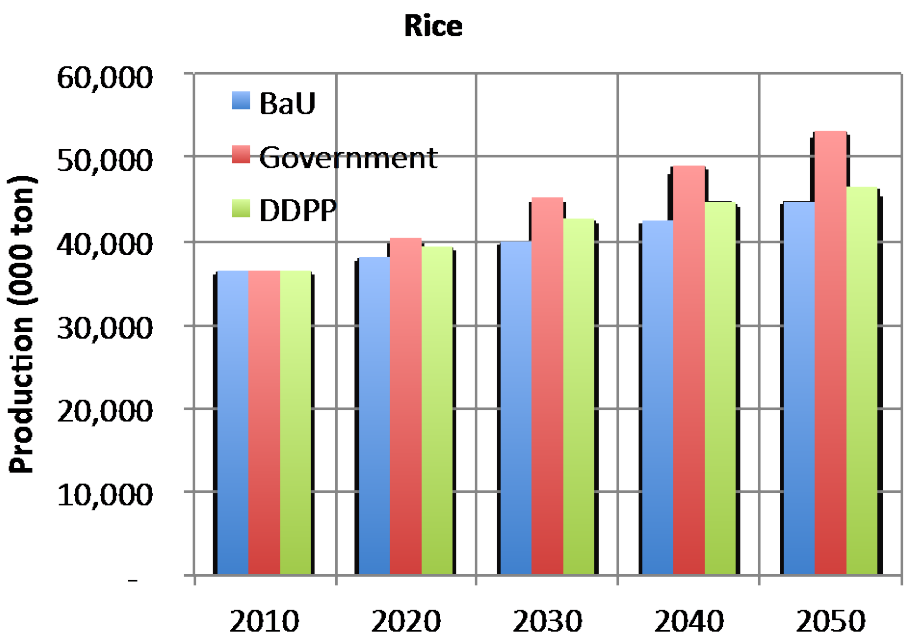


Projection of production

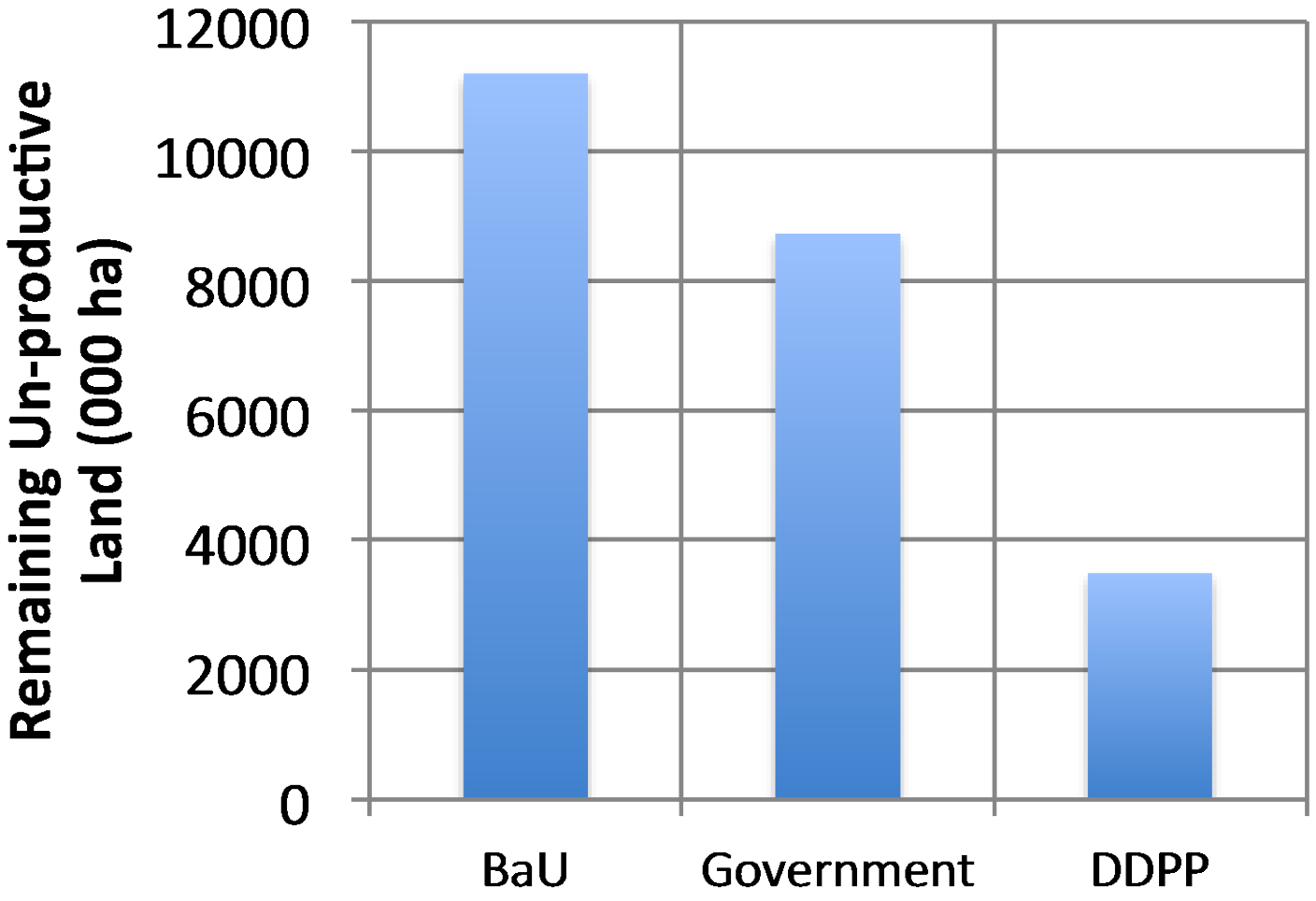








Remaining Un-Productive Lands



Epilogue

- With Government and Business target, the need for land in particularly for oil palm and wood production will be high and the loss of natural forest may over 0.9 Mha
- With deep decarbonization strategy, most of target of government still can be meet, however,
  - the target for palm oil production need to be cut half of the initial target, and
  - investment for increasing productivity of crops may be high and successful rate of reforestation/afforestation program should be increased significantly
- Insentive and disincentive policies