



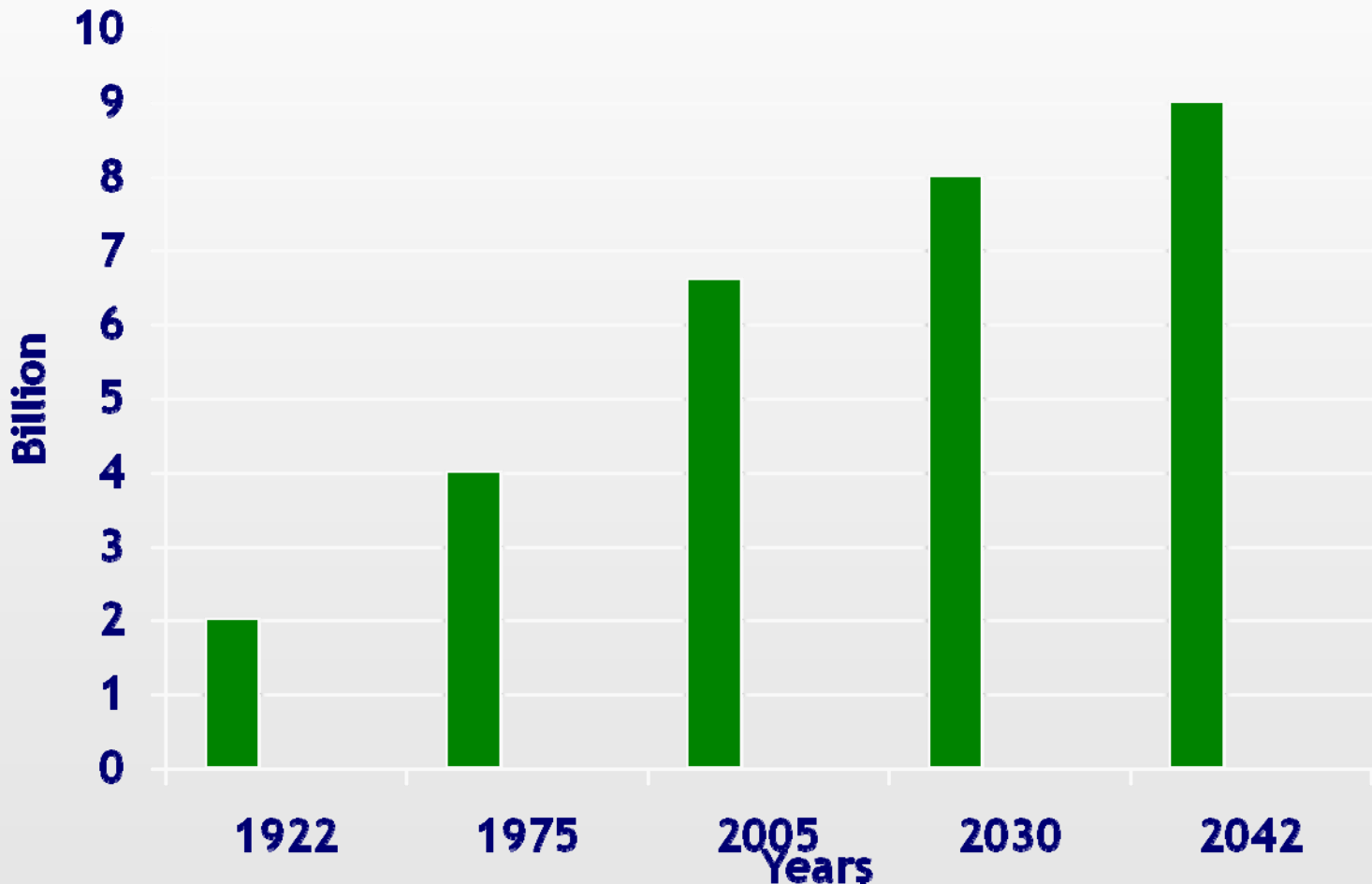
Providing correct perspective of oil palm cultivation effects on land use

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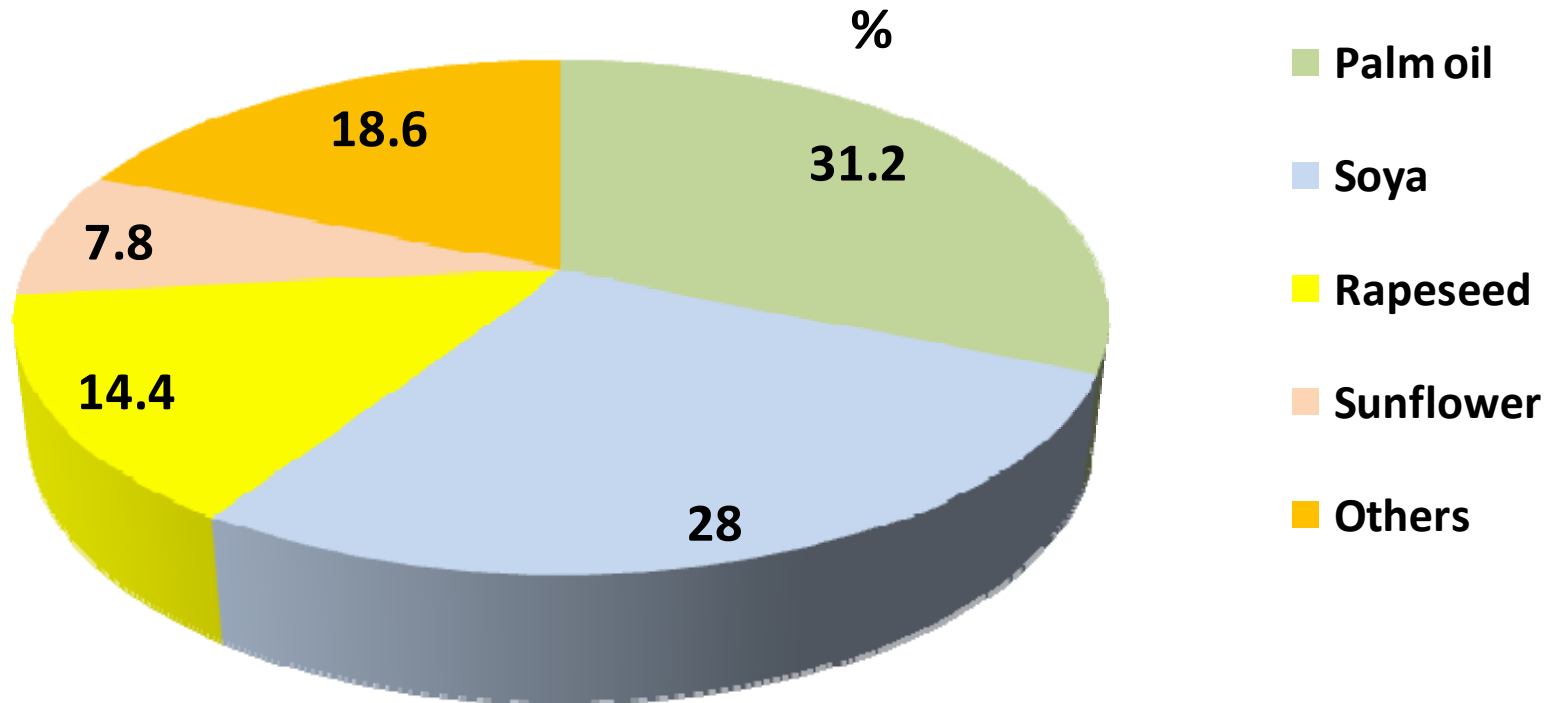
Presentation

- Importance of palm oil for food and energy use (biofuel)
- Need to use scarce land wisely
- Statistics to show oil palm cultivation on global scale can use land wisely
- Latest findings on orang utan survey
- What deforestation?
- Avoided deforestation
- Calling scientists to play their role again
- Conclusions

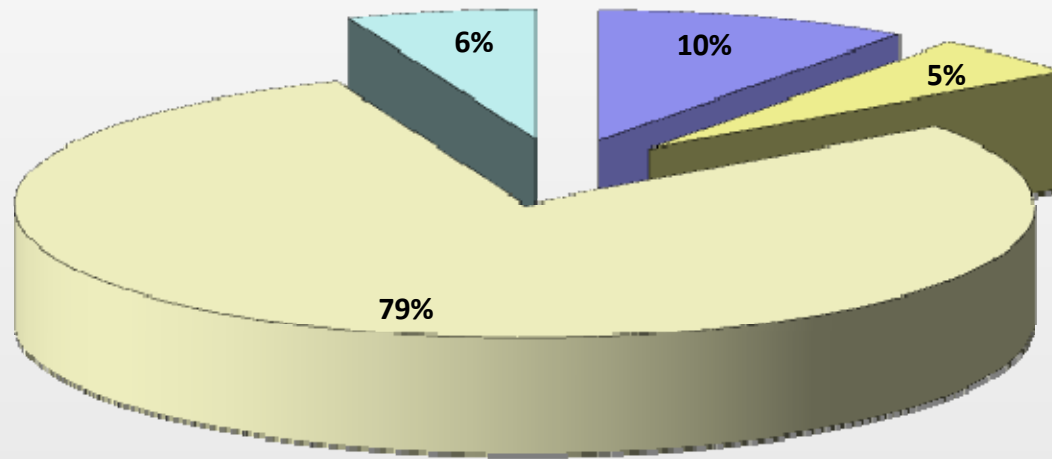
Rising world population needs rising supply of food and fuel






Palm oil is leading vegetable oil supplier in world



Usage of oils & fats for biofuel is very small



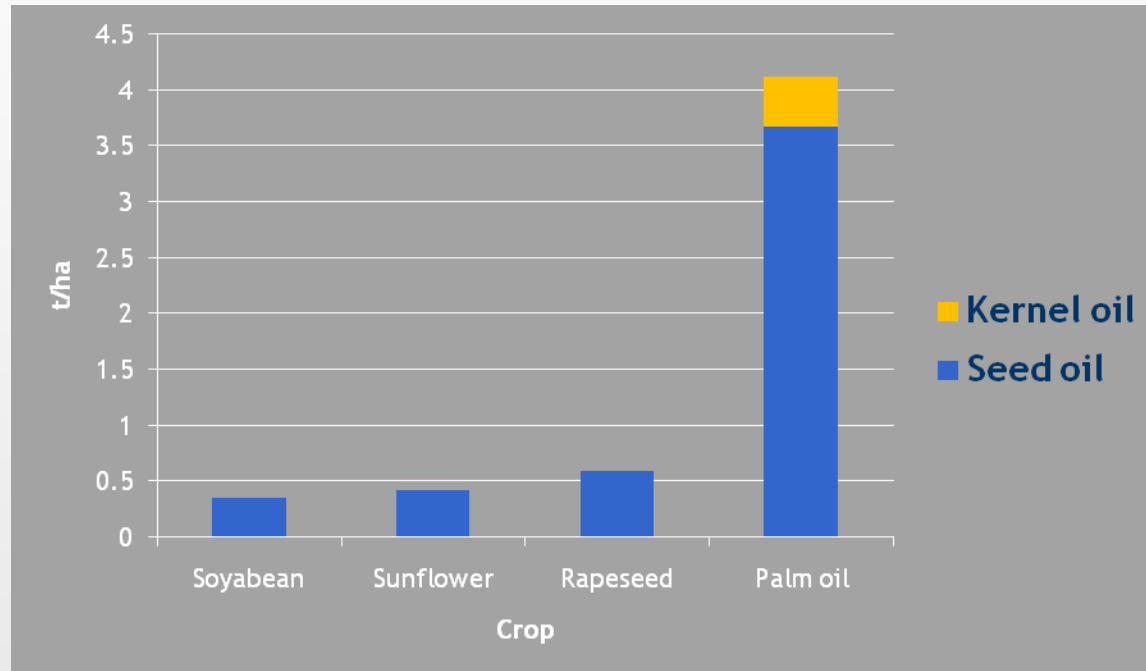
-  Oleochem
-  Biofuels
-  Food
-  Animal

Need to use land wisely

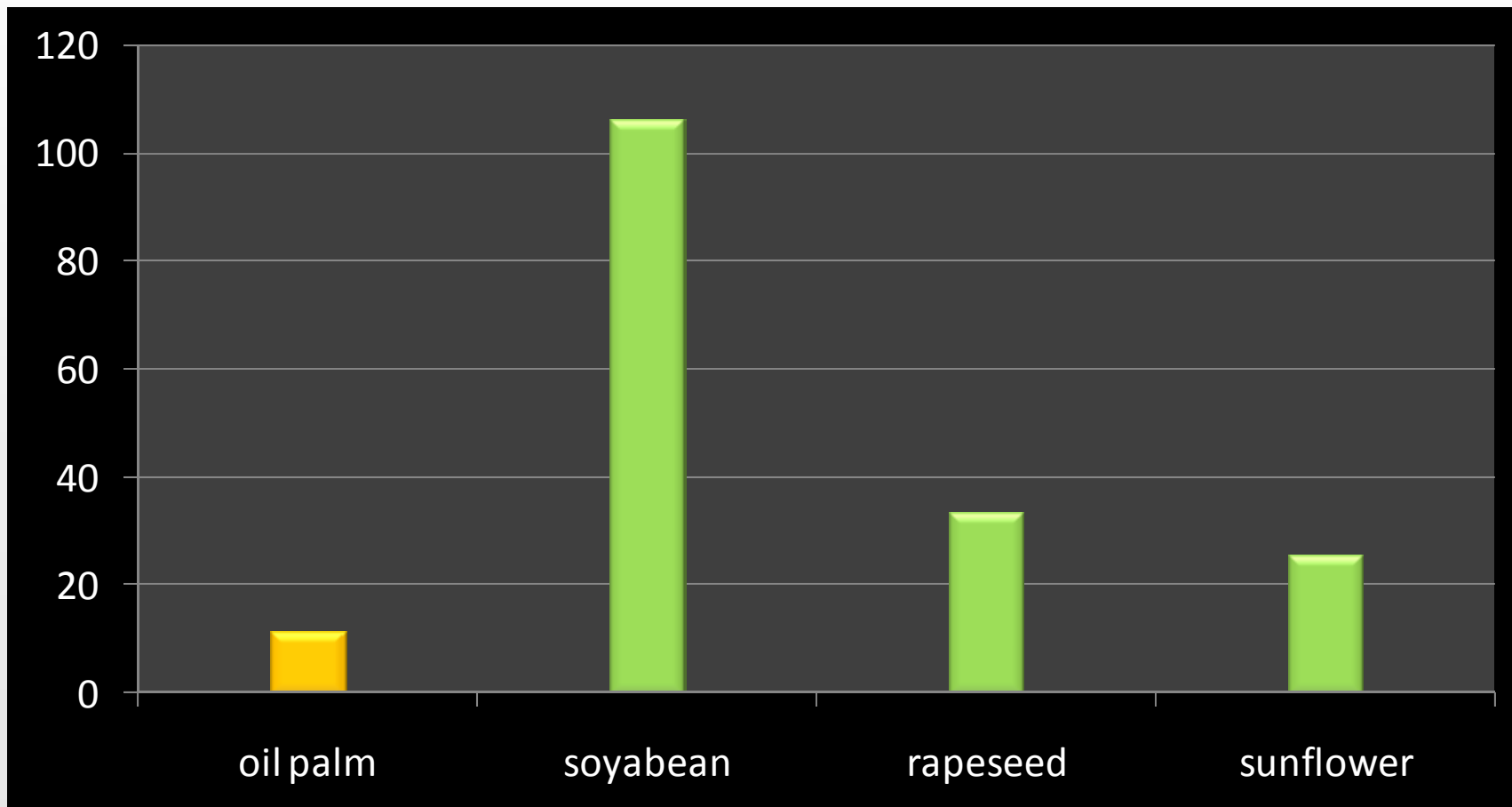
Year	World population (billion)	Arable land per capita ($\times 10^{-3}$ km ²)	Arable land per capita (ha)
1922	2.0	7.50	0.75
1975	4.0	3.75	0.38
2005	6.6	2.27	0.23
2030	8.0	1.88	0.19
2042	9.0	1.67	0.17

- World population increasing
- Limited land resource decreasing
- Oil palm is wise choice to tackle these issues due to high yield per hectare

High land productivity of oil palm



Harvested area of oil crops in world (million ha)



Oil palm occupies less than 5% of oil crops area and less than 1% of agricultural land area in world

Cultivated area of oil seeds in the world

Land use type	Total area (million ha)	As % of total area
Total agricultural land*	4967	100%
Oil seeds **	233	4.69%
Oil palm**	11	0.22%***
Soyabean**	92	1.85%
Rapeseed**	30	0.60%
Sunflower**	23	0.46%
Coconut**	9	0.18%
Other oil seeds**	68	1.37%
Malaysian oil palm	4.3	0.09%

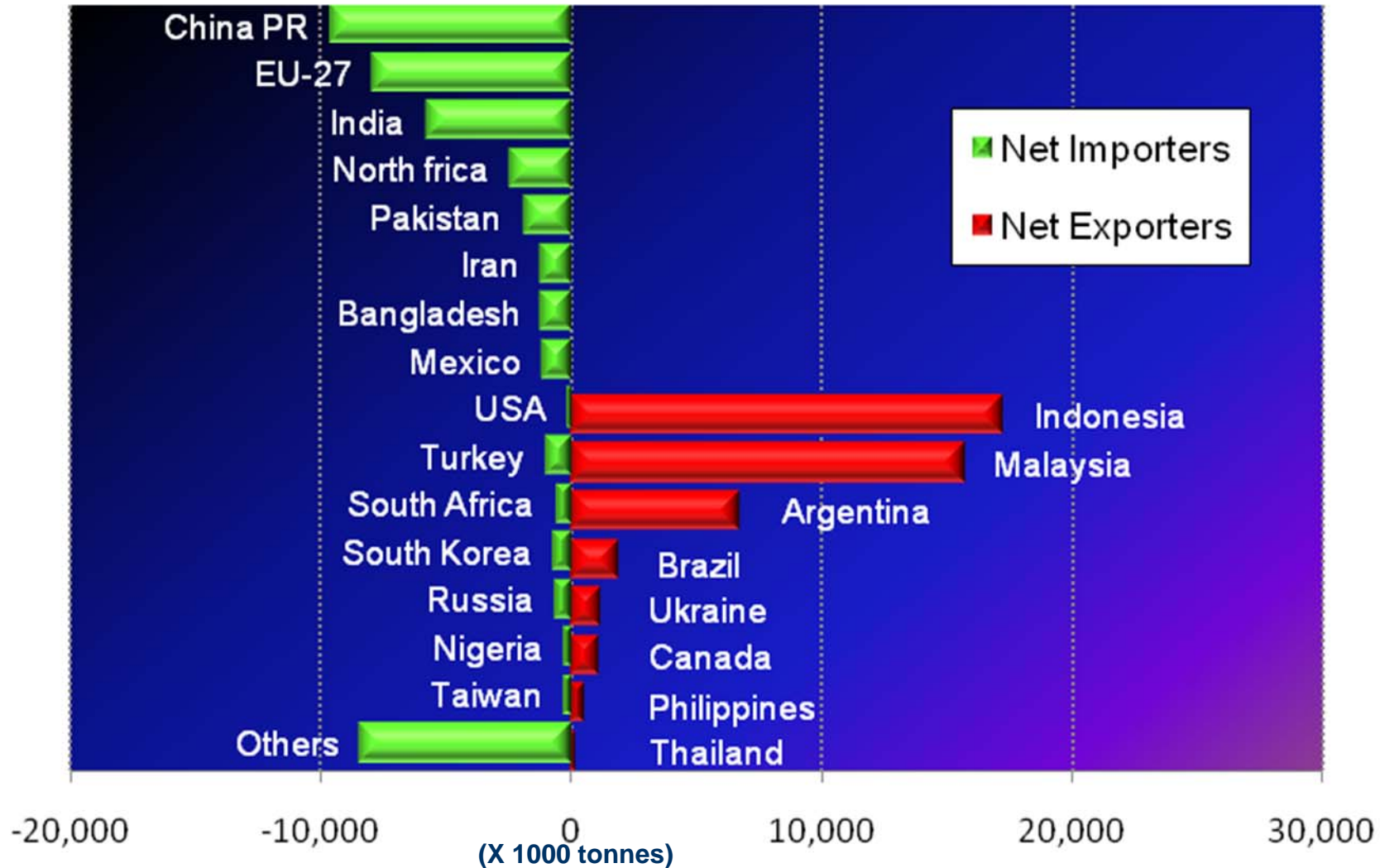
*** oil palm cultivation comprises 4.7% of total land area planted with oil seeds & 0.22% of world agricultural land

Sources: * FAO ** Oil World

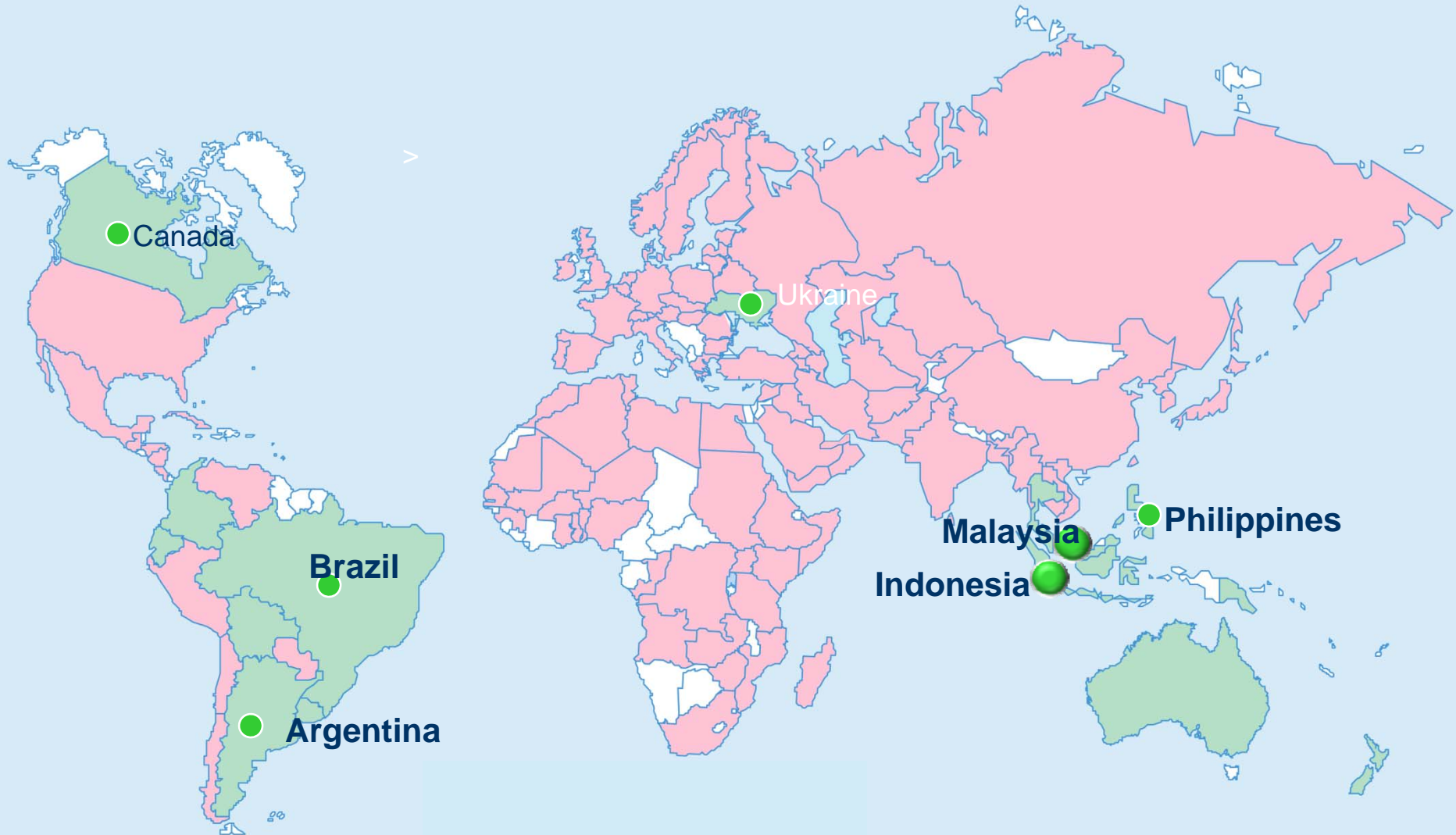
Efficient use of land

- Current total land to produce 4 major vegetable oils is 176.8 m ha
- Hypothetically, if oil palm, being the most efficient oil crop, given the role to produce vegetable oil for the world, it only needs 30.3 m ha
- Making available 146.5 m ha or 6 times size of UK for other land use
- If all 176.8 m ha planted with oil palms, 651 m tonnes oil produced; equivalent to 5 times present demand
- Rest of the oil can be used for other purposes eg for biofuel
- This is more than enough to meet world's demand for food & biofuel of 263 m tonnes in the year 2030

Net importing and exporting countries for oils & fats



Main exporters of oils & fats are palm oil producing countries.
Oil palm producers avoid deforestation in importing countries
Oil palm producers accused of deforestation while helping
importing countries not to deforest.



World-wide avoided deforestation in importing countries by choosing palm oil as food & biofuel

Parameter	Amount
Avoided deforestation when oil palm substitutes	
•Rapeseed cultivation	53 thousand ha
•Soyabean cultivation	87 thousand ha
Avoided carbon stock loss in this	
•Rapeseed area	4 m tonnes of C
•Soyabean area	6.7m tonnes of C

Indirect land use change effect

- Direct land use change results eg by Fargione et al (2008) stated that palm oil production from clearing forested land gives palm oil a carbon debt lasting 86-840 years
- Indirect land use change effect of oil palm substituting (or avoiding) rapeseed & soyabean from being cultivated not considered
- Palm oil production has a carbon credit (not a carbon debt) if this is considered

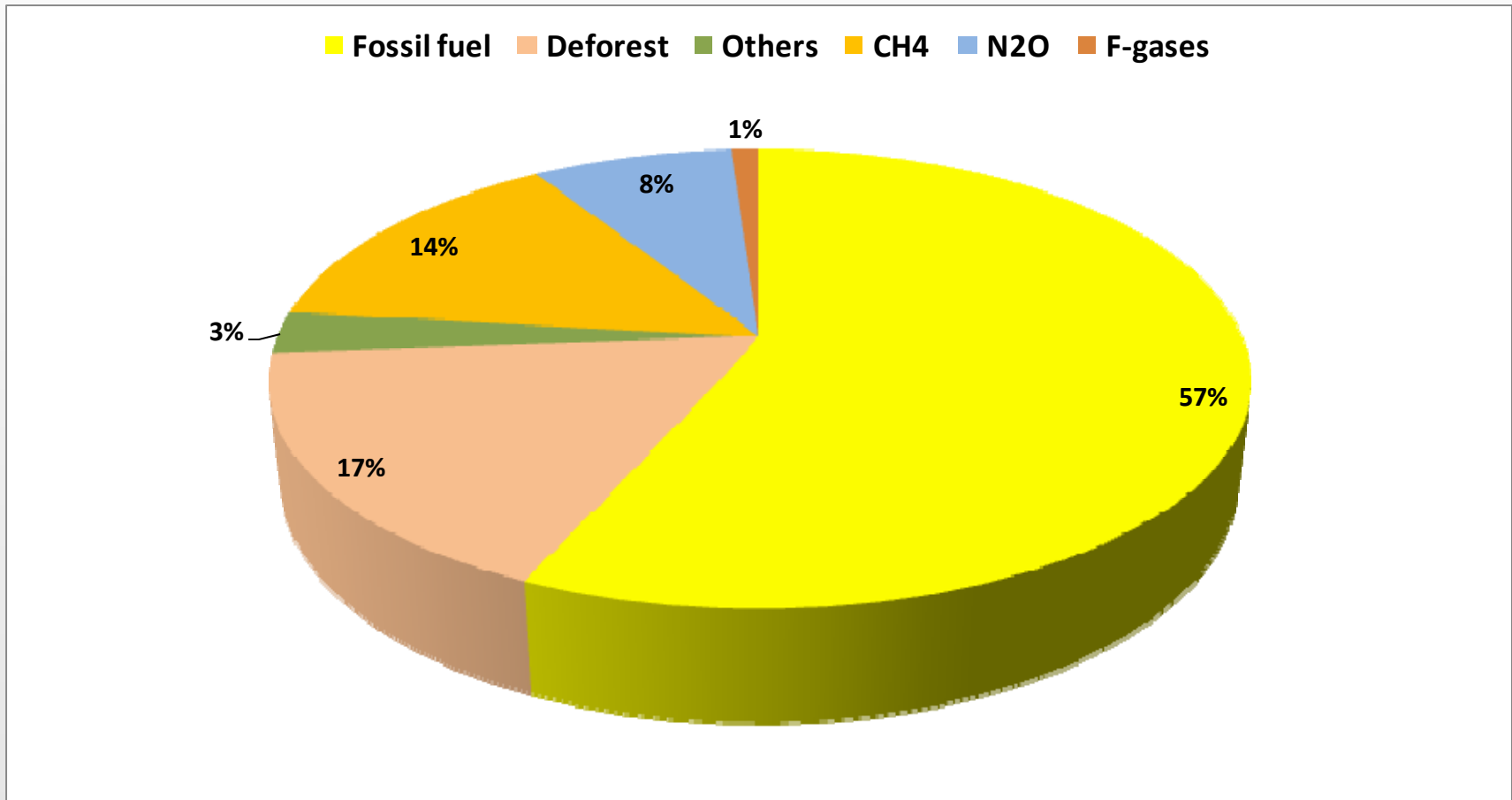
Palm oil substitution carbon credit (POSCC)

- Defined as number of years needed in production of palm oil to produce the same amount of CO₂ emitted by substitution oil crops during land clearing
- If oil palm substitutes rapeseed, POSCC is 324 years (if oil palm cultivated on degraded tropical forest) and 472 years (oil palm to oil palm replant)
- If oil palm substitutes soyabean, POSCC is 1,395-1,543 years
- Oil palm cultivation results in a carbon credit (not carbon debt)

Aerial surveys of orang utan nests in oil palm landscape of East Sabah

- conducted by Borneo Conservation Trust
 - Sabah Wildlife Department
 - NGO Hutan with funding from Malaysian Palm Oil Council from MPOWCF Fund
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- Found that Sabah has 11,000 wild orang utan as 16 major populations of 50 individuals
 - Most live in surrounding areas
 - Use oil palm plantations as connecting pathways
 - Found that orang utan eats oil palm fruits too

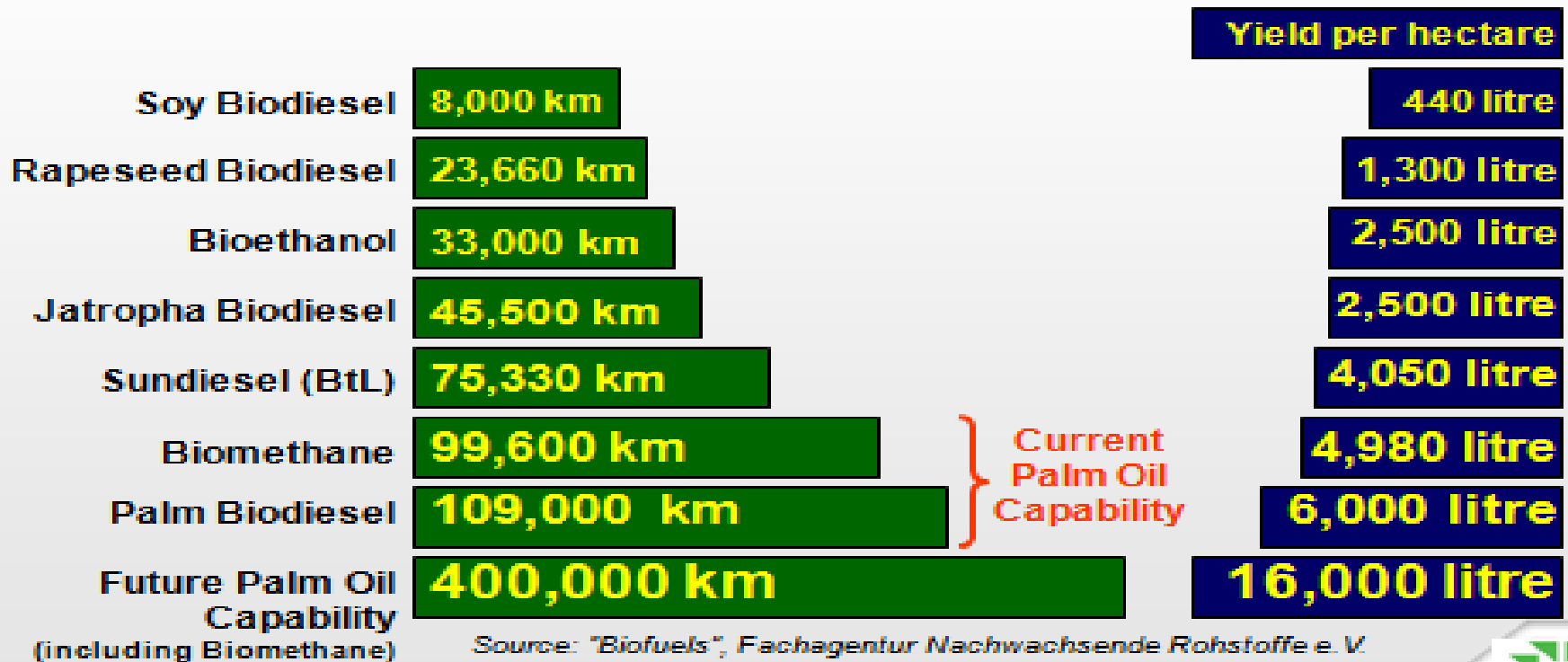
Sources of GHG emissions (CO₂ equivalent)



Largest amount of GHG from fossil fuel use makes biofuel use a good option to arrest climate change

Only clonal oil palm material holds key to future

Mileage per hectare per year - based on a VW Polo -



Source: "Biofuels", Fachagentur Nachwachsende Rohstoffe e. V. (FNR), 2006 ; Preusser (2008) and own data

LCA GHG emissions of palm biodiesel

Emission sources	Amount (kg CO ₂ /tonne biodiesel)	
1. Production of fertilizers used	185	(11.5%)
2. Nitrous oxide emitted	130	(8.1%)
3. Use of pesticides	34	(2.1%)
4. Transportation & machinery use	89	(5.6%)
5. Milling & refining of palm oil	19	(1.2%)
6. EFB	87	(5.4%)
7. Effluent ponds	824	(51.5%)
8. Transportation to mills, refineries	36	(2.3%)
9. Biodiesel refining	197	(12.3%)
Total	1,601	(100%)
10. Production & use of fossil fuel	4,228	
11. Palm biodiesel savings	2,627	
12. GHG emission savings relative to fossil diesel	62%	

Source: van Zutphen (2007)

GHG emission savings exceed 35% threshold value of EU Directive

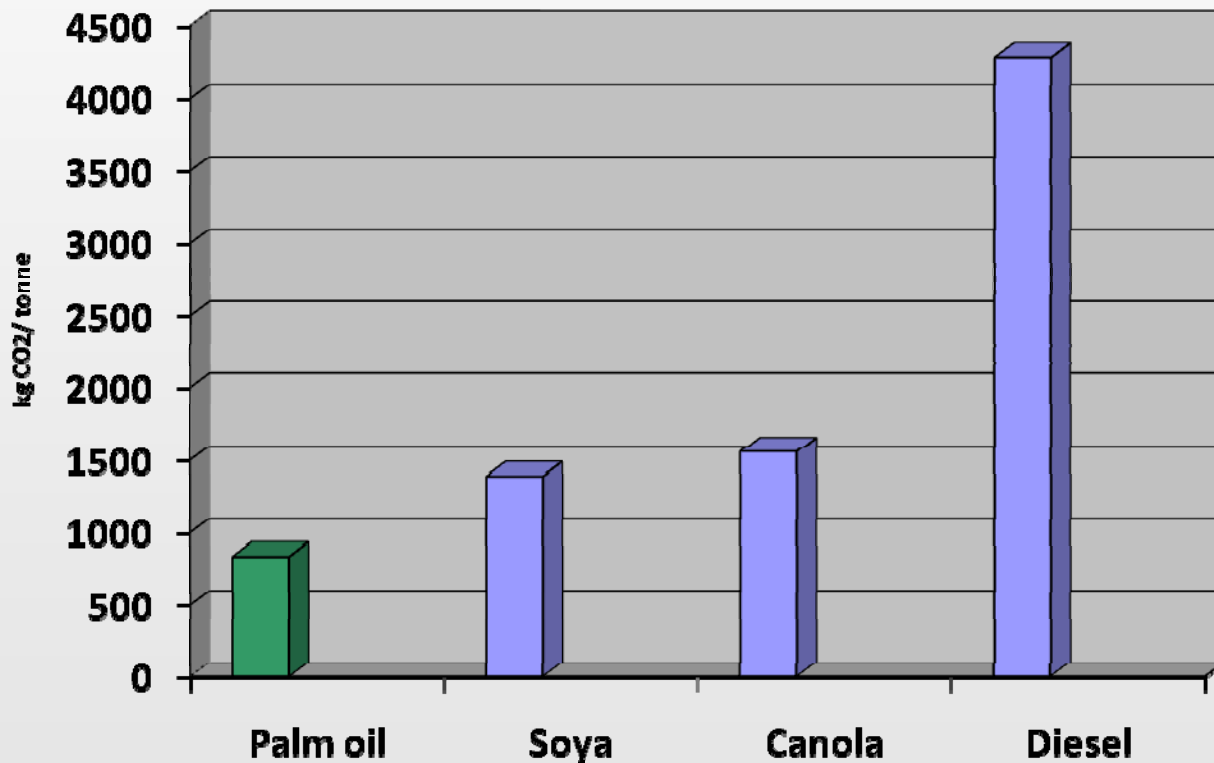


Oil palm is a net carbon sequester

Parameter	Practice if methane not trapped in effluent ponds (kg CO ₂ -e/tonne CPO)	Practice if methane trapped in effluent ponds (kg CO ₂ -e/tonne CPO)
1)LCA CO ₂ -e emitted	-1,601	-1,601
2)LCA CO ₂ -e emitted after allocation to co-products	-1,143	-512
3)CO ₂ -e sequestered	+870	+870
4)Avoided deforestation	+8,266	+8,266
Net CO ₂ -e emitted (-) or Sequestered (+)	+7,993	+8,624

1)GHG emission allocated to CPO, palm kernel oil, palm kernel cake and EFB based on weight (2) life cycle of oil palm is 25 years

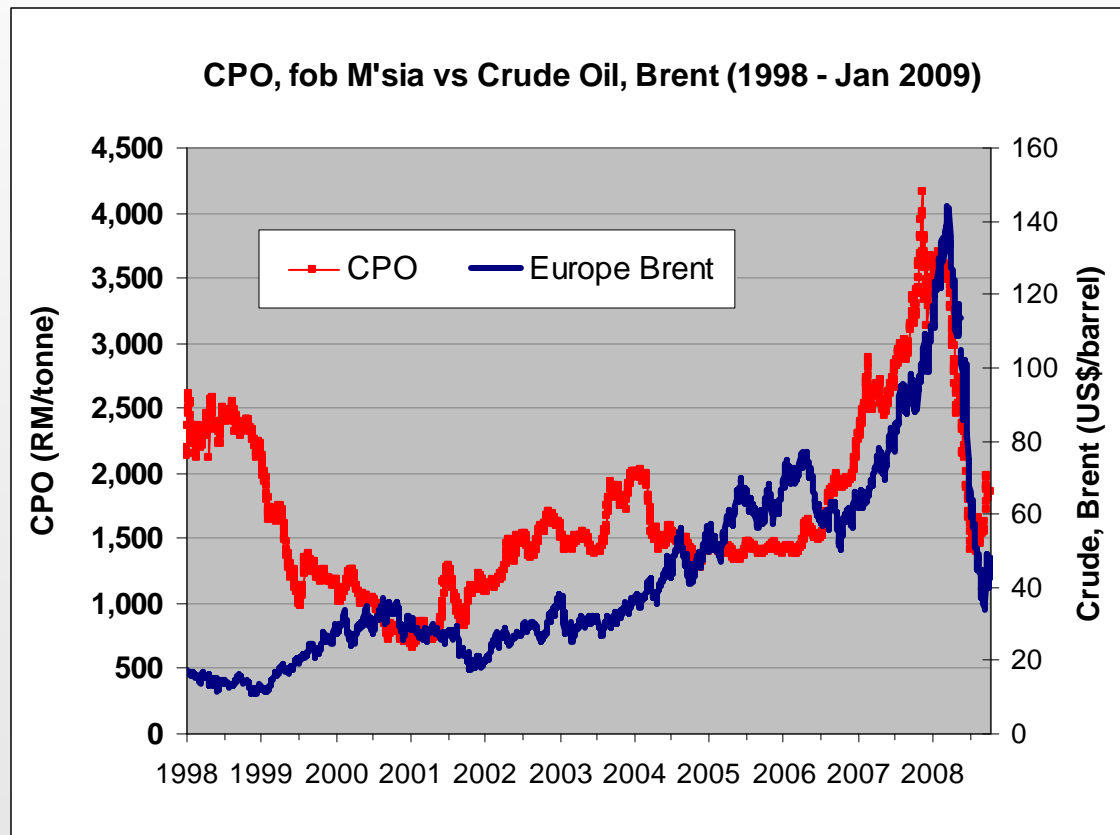
Lower C footprint for biofuel production



Source: van Zutphen(2008)



Correlation between CPO price and diesel oil price



Oil palm is proven crop for developing countries

- Malaysia as example
- Oil palm is grown on legal agricultural land in Malaysia
- Adopts responsible practices just like rapeseed and soyabean
- Adopts good agricultural & management practices eg zero burning, integrated pest management, trapping methane
- RSPO (proof of sustainable production)

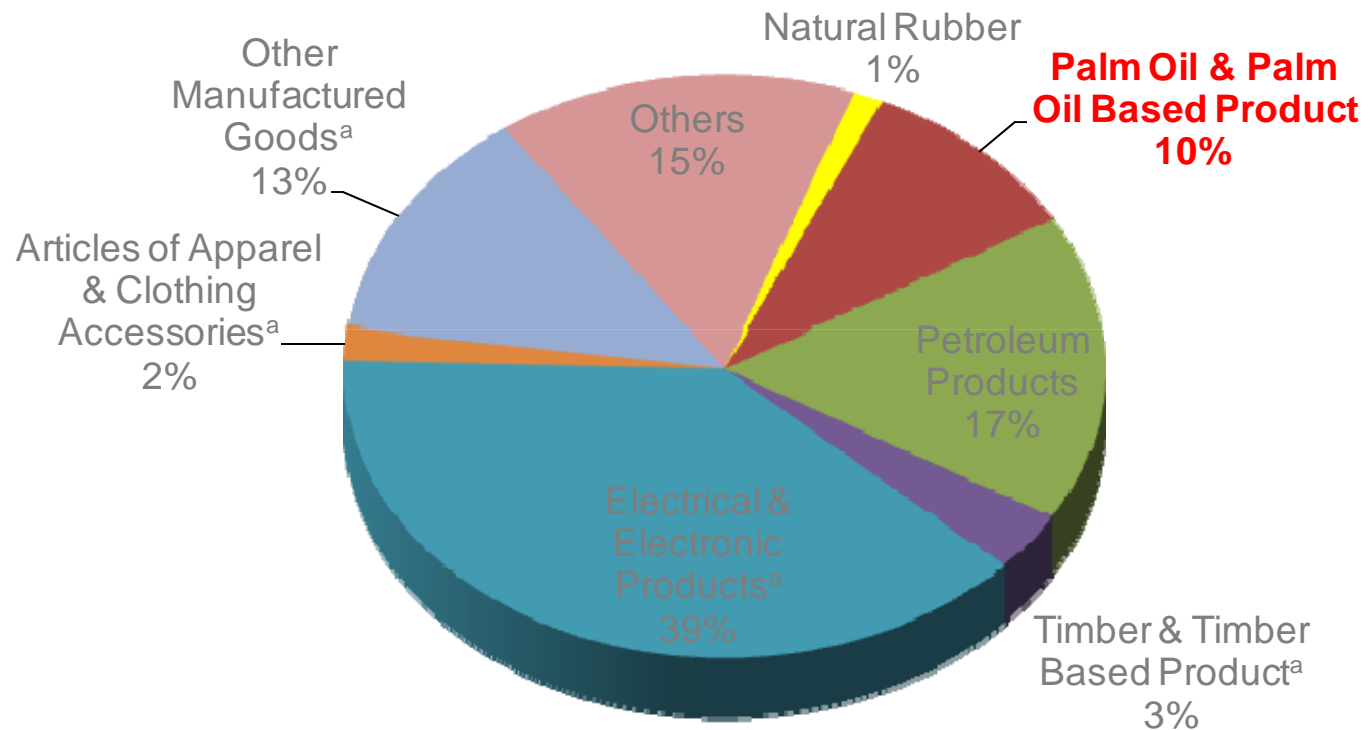
Oil palm is proven crop for developing countries

- Oil palm is a suitable crop for tropical developing countries
- Palm oil is a major revenue earner for Malaysia (10% of total export earnings for country)
- Poverty eradication in Malaysia with income of Felda settlers significantly higher than national rural poverty line
- This is possible by respecting 3Ps principles of sustainability

Felda as a good role model to develop agriculture in developing countries

Land use	Area	Area as % of total land
Oil palm	720,076	84.4
Rubber	86,183	10.1
Sugar cane	2,449	0.3
Other agriculture	2,432	0.3
Housing/infrastructure	42,173	4.9
Total	855,313	100

Palm oil's significant contribution to Malaysian economy in 2008



Potential of developing countries to produce more food & biofuel from oil palms

Country	Forest land (m ha)	Agric (m ha)	Urban & built up area (m ha)	Idle land (m ha)	Total (m ha)
Brazil	477.7(56.5%)	263.6(31.2%)	84.6	20.0	845.9
Indonesia	88.5 (48.8%)	47.8 (26.4%)	18.1	26.8	181.2
Malaysia	20.9 (63.5%)	7.9 (24.0%)	3.3	0.8	32.9
PNG	29.4 (64.9%)	1.1 (2.4%)	4.5	10.3	45.3
Philippines	7.2 (24.1%)	12.2(40.9%)	3.0	7.4	29.8
Thailand	14.5 (28.4%)	18.6 (36.4%)	5.1	12.9	51.1
Total	638.2 (53.8%)	351.2 (29.6%)	118.6 (10%)	78.2 (6.6%)	1,186.2 (100%)

288 m t palm oil potential

Business ethics using scare tactics and emotions

- Oil palm cultivation causing large deforestation (not true)
- Killing orang utans (not true)
- Scientists were revered to provide guidance to formulate government policies based on science
- It is timely for scientists to play their critical role again

Conclusions

- Continuous need for oils & fats to feed ever growing world population
- New era of using vegetable oils for biofuel production
- Palm oil contributes significantly to 31% of total vegetable oil production
- Yet occupies less than 5 % of oil crops area and less than 1% of agricultural land in world
- Hypothetically, if oil palm given role to produce oil supplied by 4 major oil crops in world, it requires only 30 million ha
- This will free 147 million ha of land for other land use without need to deforest or open new land

Conclusions

- Palm oil biofuel is green biofuel and LCA GHG emission savings definitely exceeds 35% threshold value (EU Directive) but proper studies must be carried out
- In reality, palm oil biodiesel is a net carbon sequester if logical contributions of all credits are accounted for
- Oil palm cultivation is proven crop to eradicate poverty and uplift economy of developing countries
- Estimated 78 million ha of idle or under-utilized land in oil palm growing countries with a potential yield of 288 million tonnes CPO without need to open up new land
- Oil palm expansion in developing countries must not be curtailed unless the alternatives offer better GHG emission reduction effects

Conclusions

- Only 8 countries in world self sufficient in oils and fats, the rest are mostly net importers
- Palm oil already avoids deforestation (53-87 t ha) and avoids loss of carbon stock (4-6.7 million tonnes C) in importing countries
- Palm oil substitution carbon credit (POSCC) of 324 - 1,543 472 years from indirect land use effect when oil palm substitutes rapeseed or soyabean
- Parting note to call scientists to play their critical role to guide policy decisions through science and not let emotion rule so as to avoid wastage of precious funds

A misty landscape with palm trees and dense vegetation. The scene is hazy, with a thick layer of fog or mist obscuring the background. In the foreground, there is a dense thicket of green plants, including many palm trees. The overall atmosphere is serene and somewhat ethereal.

Thank You