



Biodiesel & its Impact on the Oleochemicals Market

U.R. Unnithan, Carotino Sdn Bhd

Apr 27, Lotte Hotel & Resort, Seoul, South Korea

Presentation Outline

1. Global Biodiesel Production in 2014
2. Oils & Fats Supply Scenario until 2025
3. Global Biodiesel Mandates
4. Malaysian Biodiesel Implementation
5. Indonesia's Biodiesel Implementation Program
6. Oils & Fats Scenario in 2025
7. FCPO vs ICE Gas Oil Monthly Average Price Trend
8. Biodiesel – Main Driver for Price of CPO

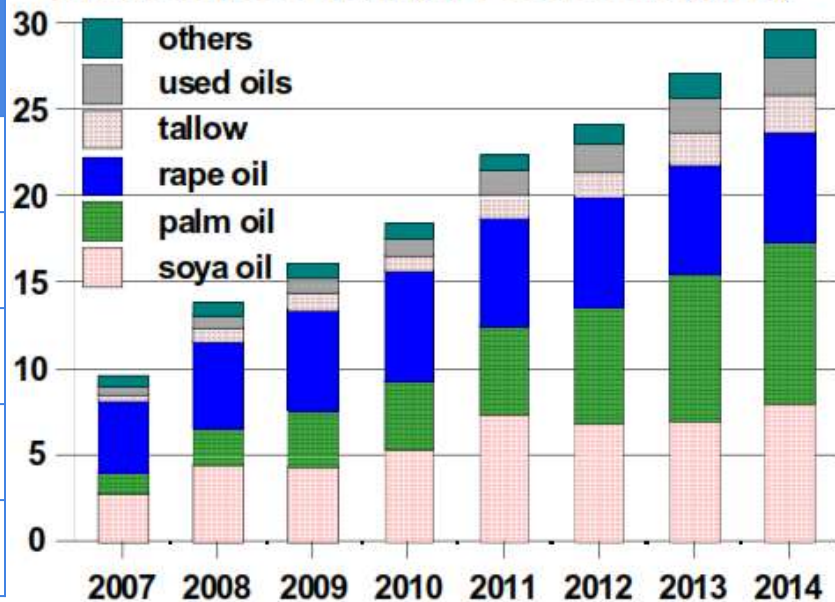
Presentation Outline

9. Value addition to PME
10. Global CNO/CPKO production
11. CNO & CME Production in Philippines up to 2025
12. FCPO vs CCNO/CPKO Price Trend
13. Price advantage of C16 & C18 Alcohol derived from CPO vs CPKO/CNO
14. Oleo-chemical applications of C16/C18 ME
15. Biodiesel's Impact on Global Glycerine Market
16. Summary of Impact of Biodiesel on Oleochemical Industry

Global Biodiesel Production in 2014

BIODIESEL	Global Production Quantity (2014)	Share of Global Oils & Fats Production	Share of Individual Oils & Fats Production
PME	9.3 million MT	5%	15% of PO Prod.
SME	8.0 million MT	4%	17% of SBO Prod.
RME	6.3 million MT	3%	23% of RSO Prod.
TME	2.2 million MT	1%	8% of Animal Fats Prod.
ALL BIODIESEL	30 million MT	15%	

Biodiesel Use of Major Feedstock (Mn T)



Source : Oil World

Global Biodiesel Production in Key Countries 2014

TOP 15 FAME PRODUCING COUNTRIES IN 2014 (Estimations in KT), 81% of Global Production

<u>Rank</u>	<u>Country</u>	<u>Production</u>	<u>Consumption</u>	<u>Exports</u>	<u>Imports</u>	<u>Trade Balance</u>	<u>% exported</u>	<u>Self-reliance</u>
1	US	4,330	4,700	280	650	-370	7%	86%
2	Brazil	3,000	2,960	40	0	40	1%	100%
3	Germany	2,850	1,860	1,460	470	990	51%	75%
4	Indonesia	2,650	1,430	1,220	0	1,220	46%	100%
5	Argentina	2,575	965	1,610	0	1,610	63%	100%
6	France	2,165	2,650	70	555	-485	3%	79%
7	Italy	1,075	1,400	185	510	-325	15%	68%
8	Thailand	1,060	1,060	0	0	0	0%	100%
9	Spain	955	710	590	345	245	62%	51%
10	China	850	1,350	0	500	-500	0%	63%
11	Poland	665	665	220	220	0	33%	67%
12	Malaysia	600	350	250	0	250	42%	100%
13	Netherlands	570	245	1,340	1,015	325	Hub	Hub
14	UK	555	850	30	325	-295	5%	62%
15	Colombia	515	515	0	0	0	0%	100%

Oils & Fats Supply Scenario until 2025

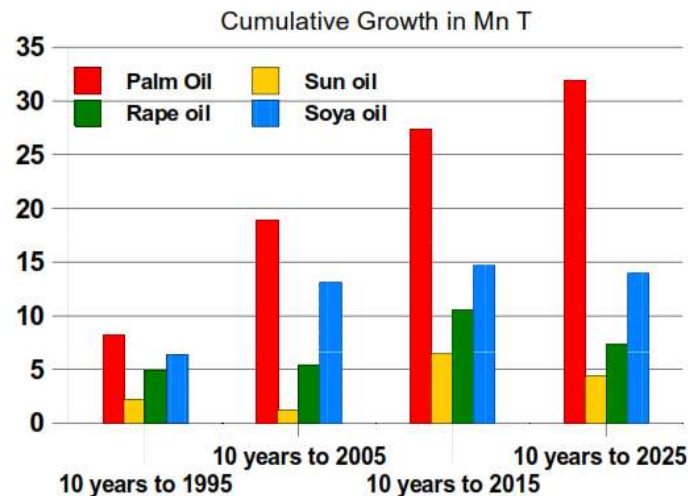
- Production growth in 4 major oils & fats from 2015 to 2025 = 57 million MT.
- Production growth of Palm Oil from 2015 to 2025 = 32 million MT (56% of growth)

PALM OIL : World Production by Major Countries (Mn T)

Production	Forecasts			Actual Data			
	2025F	2020F	2015F	2010	2005	2000	1995
Malaysia	26.50*	23.50*	19.80*	16.99	14.96	10.84	7.81
Indonesia	51.00*	41.70*	32.40*	22.50	14.10	7.05	4.22
Nigeria	1.47*	1.24*	1.02*	.89	.80	.74	.66
Colombia	1.90*	1.60*	1.25*	.75	.67	.52	.39
Thailand	3.40*	2.80*	2.10*	1.36	.70	.53	.35
Oth ctrs.	9.23*	6.90*	4.97*	3.79	2.92	2.36	1.77
WORLD	93.50*	77.74*	61.54*	46.28	34.15	22.04	15.20

Source : Oil World

World Production Growth of 4 Oils



Biodiesel Mandates

NO.	COUNTRY	%Vol., 2015
ASIA		
1.	Indonesia*	15.0
2.	Malaysia	7.0
3.	Philippines	5.0
4.	South Korea	2.0
5.	Thailand**	6.0 – 7.0

* From May 2015 ?

**increased from 3.5% in Jan to 7% in Apr 2015

NO.	COUNTRY	%Vol., 2015
Rest of the World, Key Countries		
1.	USA	1.28 bln gallons
2.	Brazil	7.0
3.	Germany	3.5% GHG reduction
4.	Argentina	10.0
5.	France	8.0
6.	Italy	5% energy
7.	Spain	4.1% energy
8.	China	Disc. blending
9.	Poland	7.1
10.	Netherlands	3.5
11.	UK	4.75
12.	Colombia	10.0

Malaysian Biodiesel Implementation (B5/B7)

Regions	States	%Vol.	Implementation Date
Central	Putrajaya, KL, Selangor, Melaka & Negeri Sembilan	B5	June – Nov 2011
Southern	Johor	B5	July 2013
Eastern	Pahang, Kelantan & Terengganu	B5	Feb 2014
Northern	Penang, Kedah, Perak & Perlis	B5	March 2014
East Malaysia	Sarawak, Sabah & Labuan	B7	Dec 2014
Malaysia		B7	Dec 2014



Wilayah Persekutuan
Oct 2011



Selangor & Completion of B5
Programme in Central Region
Nov 2011



Eastern, Northern region & Completion of B5
Programme in Peninsular Malaysia, Mar 2014



Putrajaya, June 2011



Negeri Sembilan, Aug 2011



Fisheries Sector at Jetty
Bagan Pasir, Kuala
Selangor, Feb 2012



Melaka, July 2011



Johor, July 2013



Malaysian Biodiesel Implementation

B10 Programme

- Government is considering biodiesel blending at 10% PME or B10.
- Provisional Malaysian Standard for B10 has been developed and approved.
- A B10 Sub Working Group (SWG) led by MPOB with participation from various stakeholders has been established.
- The SWG is undertaking some studies to facilitate the implementation of B10 and enable the provisional Malaysian Standard to be accepted as a full standard.
- At present, industry has been encouraged to use B10 on a voluntary basis through an incentive scheme offered to them since 2013.
- MBA is requesting the Malaysian Government to implement B10 in 2015 and B20 by 2016.

Indonesia's Biodiesel Implementation Plan

BIODIESEL (Minimum)						
Sector	Sept.2013	Jan. 2014	Jan. 2015	Jan. 2016	Jan. 2020	Jan. 2025
Transportation PSO Public Service Obligation	10%	10%	10%	20%	30%	30%
Transportation, Non PSO	3%	10%	10%	20%	30%	30%
Industry	5%	10%	10%	20%	30%	30%
Electricity	7.5%	20%	25%	30%	30%	30%

Source = APROBI,
Energy & Mineral Resources Minister Regulation No.20, 2014

- Indonesia has announced that Biodiesel Pricing will be linked to CPO instead of Gas Oil. The proposed Pricing for B100 is CPO + US\$125/MT with the maximum subsidy from Govt. at Rp4,000/Liter(USD 355/MT).
- Indonesia is planning to implement an export duty of US\$50/MT for CPO and USD 30/MT Processed Palm Oil from May 2015. The revenue from this will be used to subsidize the upcoming B15 mandate.

Indonesia's Biodiesel Implementation Plan



	2013E	2014F	2015F	2016F	2017F	2018F	2019F	2020F	2025F
Transportation PSO	16.00	17.00	18.70	20.60	22.66	24.93	27.42	30.16	48.57
Transportation Non PSO	5.00	5.00	5.50	6.10	6.71	7.38	8.12	8.93	14.38
Industry	5.50	5.00	5.50	6.10	6.71	7.38	8.12	8.93	14.38
PLN	6.00	8.00	8.80	9.70	10.67	11.74	12.91	14.20	22.87

Indonesia's forecasted Biodiesel volume :

In 2020 = 16.13 million MT

In 2025 = 25.97 million MT

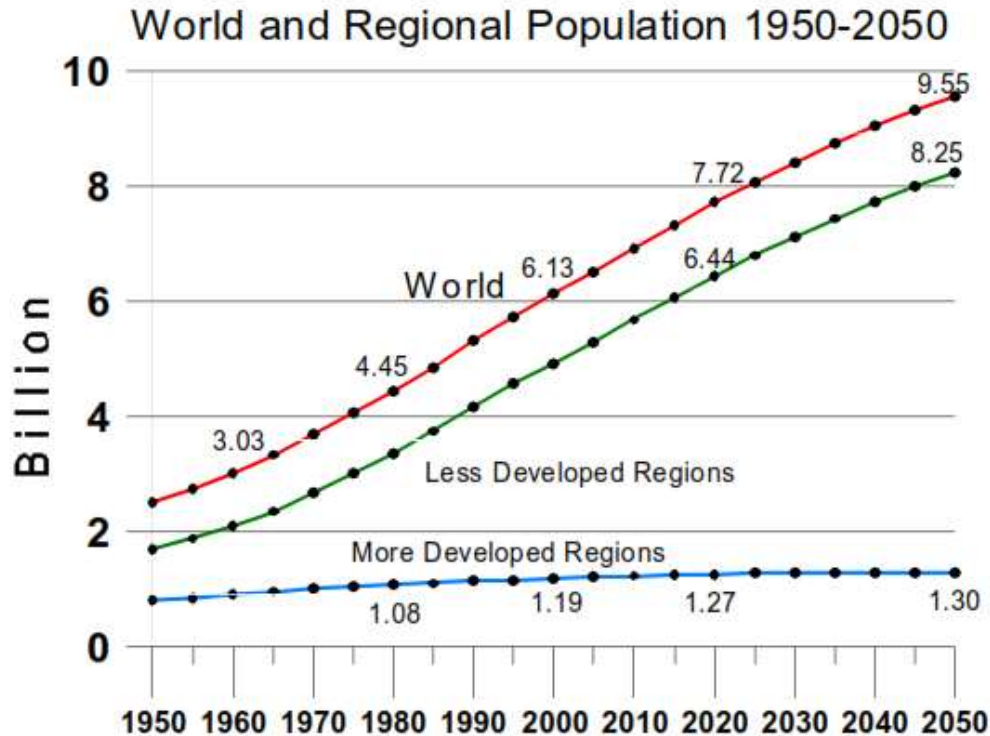
Mandate

Transportation PSO	10.00%	10.00%	10.00%	20.00%	20.00%	20.00%	20.00%	30.00%	30.00%
Transportation Non PSO	3.00%	10.00%	10.00%	20.00%	20.00%	20.00%	20.00%	30.00%	30.00%
Industry	5.00%	10.00%	10.00%	20.00%	20.00%	20.00%	20.00%	30.00%	30.00%
PLN	7.50%	20.00%	25.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%

BIODIESEL VOLUME (in million KL)

Transportation PSO	1.60	1.70	1.87	4.12	4.53	4.99	5.48	9.05	14.57
Transportation Non PSO	0.15	0.50	0.55	1.22	1.34	1.48	1.62	2.68	4.32
Industry	0.28	0.50	0.55	1.22	1.34	1.48	1.62	2.68	4.32
PLN	0.45	1.60	2.20	2.91	3.20	3.52	3.87	4.26	6.86
SUMMARY	2.48	4.30	5.17	9.47	10.42	11.46	12.60	18.67	30.06

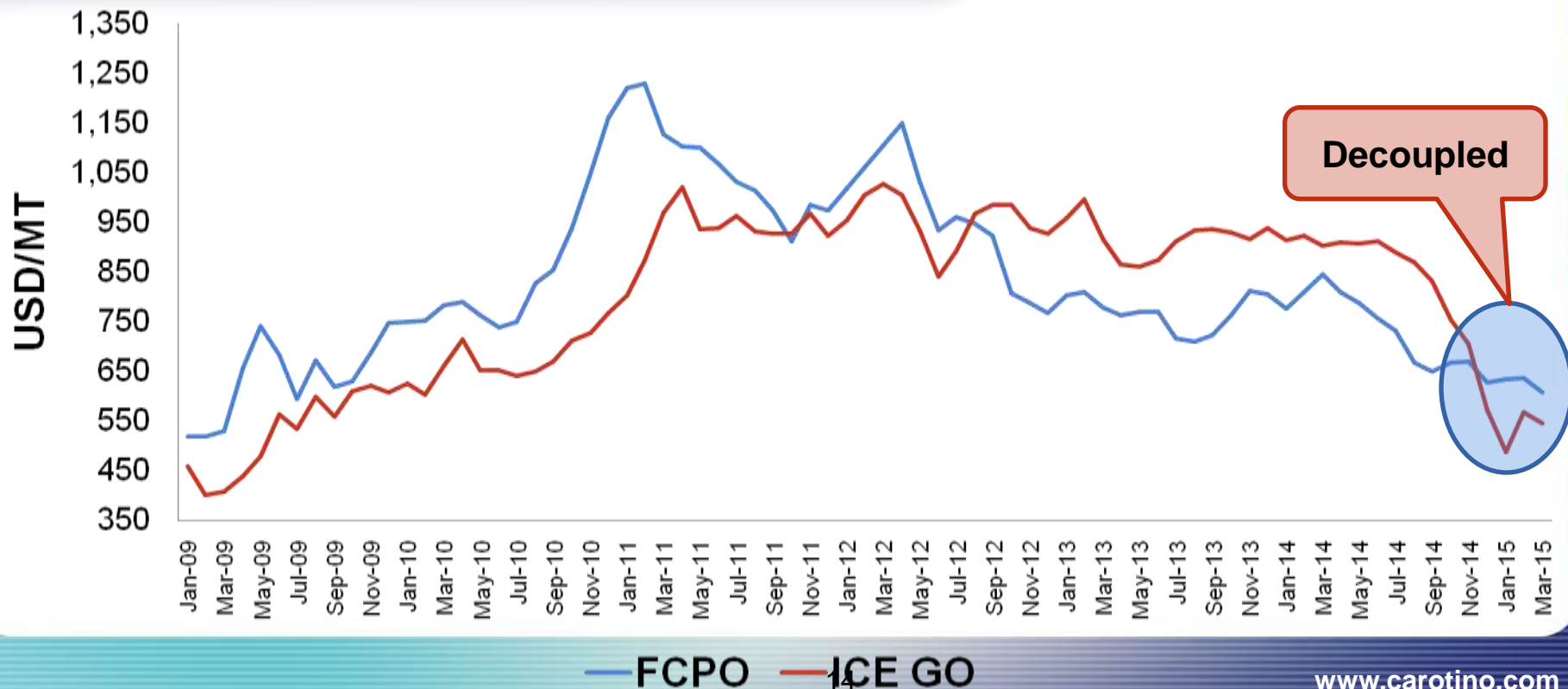
Oils & Fats Demand Scenario until 2025



SOURCE: United Nations, 2012 Revision (Medium variant)

- Estimated increase in world per capita consumption from 2013 to 2025 of oils & fats = 8 kg (extrapolated from FAO data).
- Estimated world population in 2025 = 8 billion.
- Additional oils & fats needed to meet this increased per capita demand = **64 million MT.**
- But increase in growth of 4 major oils until 2025 would only be **57 million MT.**

FCPO vs ICEGO Monthly Average (USD/MT)



Decoupled

Biodiesel – Main Driver for Price of CPO

2014



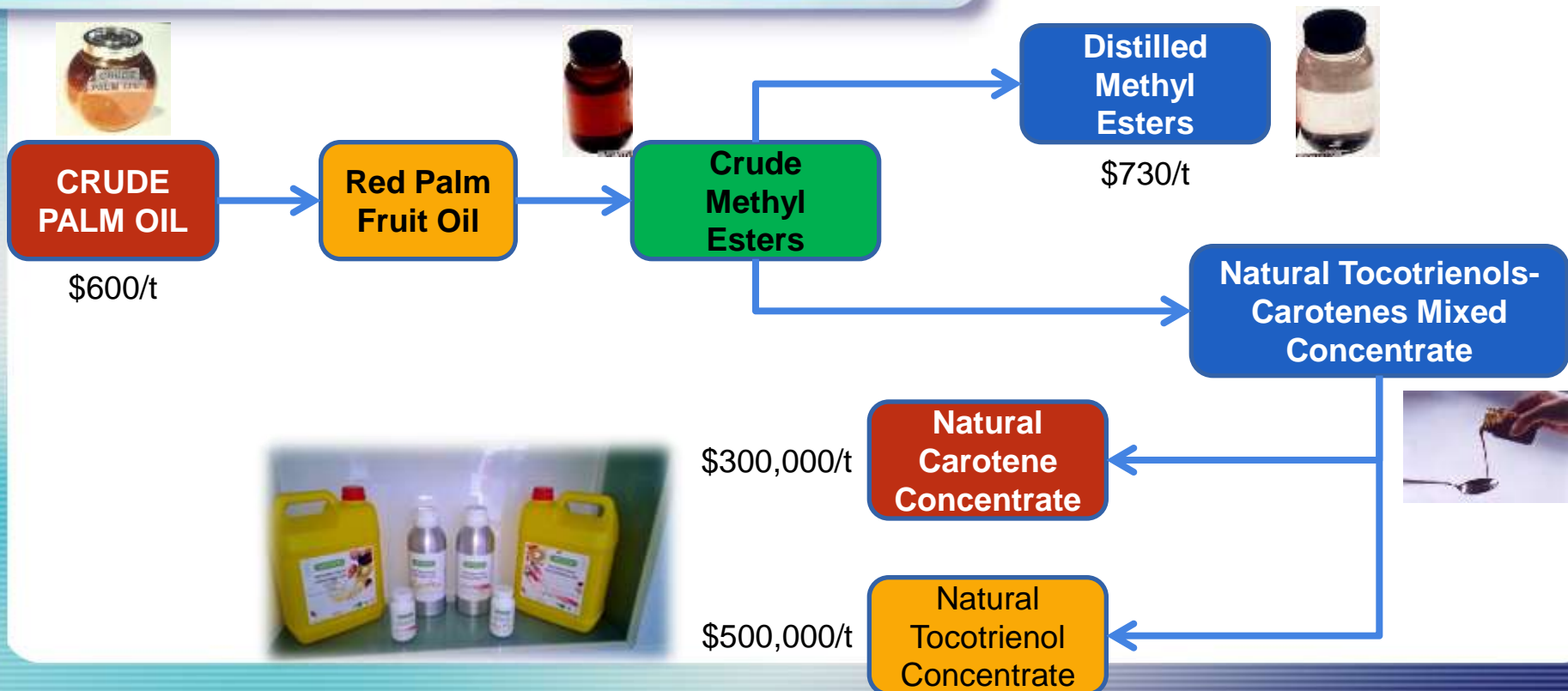
2025

BIODIESEL	Global Production Quantity	Share of Global Oils & Fats Production
PME	9.3 million MT	5% (15% of Palm Oil)
SME	8.0 million MT	4%
RME	6.3 million MT	3%
TME	2.2 million MT	1%
TOTAL	30 million MT	15%

BIODIESEL	Global Production Quantity	Share of Global Oils & Fats Production
PME	32.1 million MT	13% (34% of Palm Oil)
SME	8.0 million MT	3%
RME	6.3 million MT	2%
TME	2.2 million MT	1%
TOTAL	52.8 million MT	21%

- Assumption : Only Indonesia and Malaysia implement their biodiesel plan.
- Projected growth in 4 major oils & fats up to 2025 = **57 million MT**.
- **22.8 million MT** out of this 57 million MT will be mopped up by MY/INA mandates alone.
- Increased in demand of oils and fats for food up to 2025 = **64 million MT**.

Value Addition to PME – Extraction of Nutraceuticals



Global CNO/PKO Production

NO.	Country, CNO	Million MT
-----	--------------	------------

1.	Philippines	1.5
----	-------------	-----

2.	Indonesia	0.9
----	-----------	-----

3.	India	0.5
----	-------	-----

4.	Rest of the World	0.6
----	-------------------	-----

TOTAL		3.5
-------	--	-----

NO.	Country, PKO	Million MT
-----	--------------	------------

1.	Indonesia	3.5
----	-----------	-----

2.	Malaysia	2.3
----	----------	-----

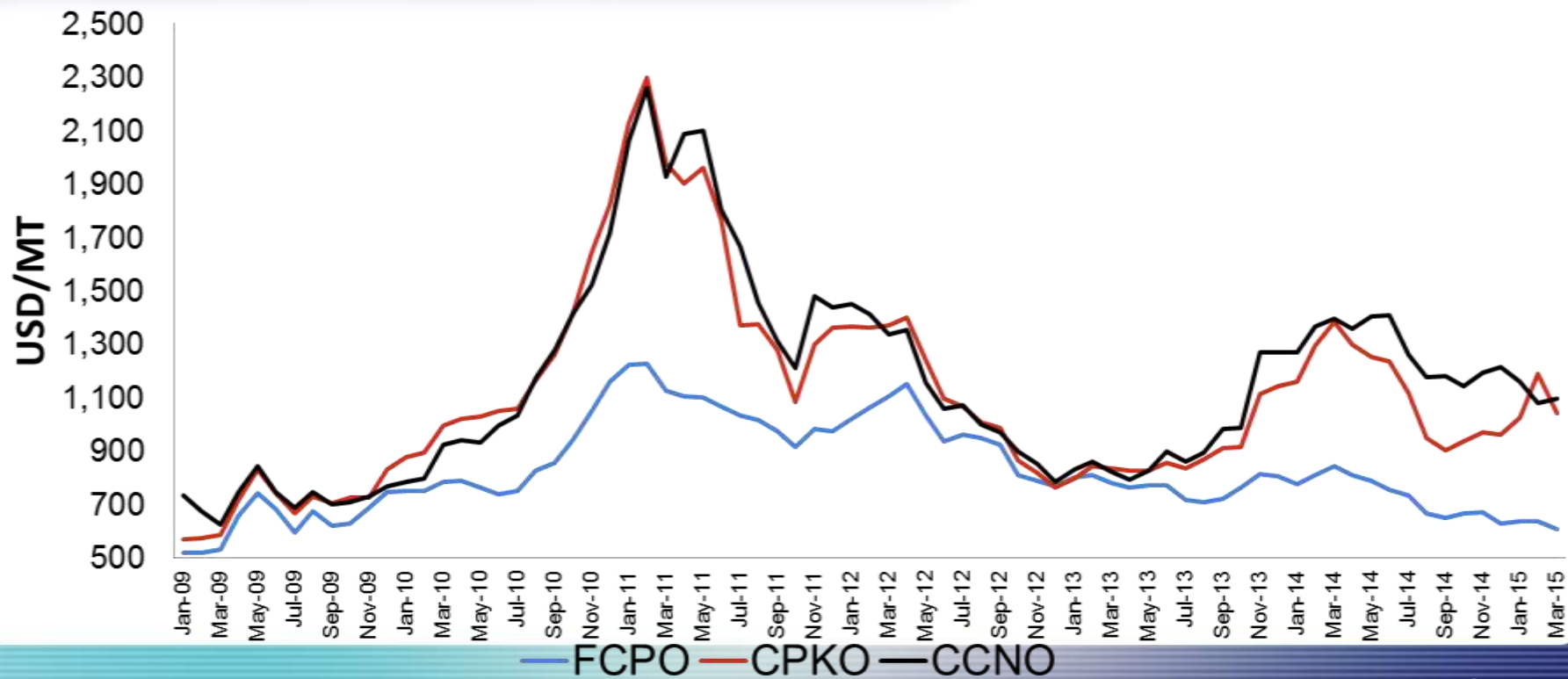
3.	Rest of the World	0.5
----	-------------------	-----

TOTAL		6.3
-------	--	-----

CNO & CME Production in Philippines upto 2025

YEAR	CNO (million MT)	CME (million MT)	CME as % of CNO Prod.
2015F	1.5	0.19	13%
2020F	2.6	0.45	17%
2025F	3.3	1.05	32%

FCPO vs CCNO/CPKO CIF Rdm Price (USD/MT)



Price advantage of C16 & C18 Alcohol derived from CPO vs CPKO

NO.	PRODUCT	PRICE (USD/MT)
1.	CPKO (local Malaysia)	945
2.	CNO (CIF Rotterdam)	1080
3.	CPO (local Malaysia)	600
4.	C16/18 Alcohols from CPKO/CNO	1350 – 1400
5.	C16/18 Alcohols from CPO	1050 – 1100
6.	Price advantage	300

Oleo-chemical applications for C16/C18 Methyl Esters

C16 Methyl Esters

Fatty Alcohols
Ethoxylates
MES



C18 Methyl Esters

Winter Grade Biodiesel
Fatty Alcohols
Ethoxylates
Drilling fluids
Pesticide carrier
Transformer Oil
Bio-lubricant
Textile lubricant
Polyurethane



Biodiesel's Impact on Global Glycerine Market

No	Source (Crude Glycerine)	2014 Vol (mMT)	2020F Vol (mMT)
1.	Biodiesel	3.0 (80%)	4.0
2.	Oleochemicals	0.8	1.0
	TOTAL	3.8	5.0

No	Source (Ref. Glycerine)	2014 Vol (mMT)	2020F Vol (mMT)
1.	Biodiesel	1.4 (61%)	2.5
2.	Oleochemicals	0.9	1.0
	TOTAL	2.3	3.5

Summary of Impact of Biodiesel Mandates on Oleochemical Industry

- Recent crude oil price crash will limit global biodiesel production/exports.
- Global biodiesel production will predominantly be dictated by Government mandates.
- Lower biodiesel production would impact Glycerine price positively (USD180/MT from Nov 2014 to April 2015).
- Extraction of Neutraceuticals is a good value addition to Palm Biodiesel business.
- Increased use of CME as biodiesel in Philippines will put pressure on CNO supply.
- C16/C18 Alcohols derived from PME have a Price advantage over corresponding CNO/CPKO derived Alcohols.
- Downstream Oleo-chemical applications of C16/18 ME will improve economics of Palm Biodiesel business.



Thank You !

www.carotino.com