Palm Oil and Food Security: Empowering Change for High Income, Sustainability and Inclusiveness

By
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Presentation Outline

- Global Oils and Fats
- Malaysian Palm Oil Industry
- Palm Oil Applications
- Sustainability, Food Safety & Security
- Transfer of Knowledge & Technologies
- Extension Services to Smallholders
- Conclusions
Global Edible Oils & Fats
Global Oils & Fats, 2016

**World Production of 17 Oils & Fats**

- Palm Oil: 29%
- Soyabean Oil: 12%
- Rapeseed Oil: 8%
- Sunflower Oil: 5%
- Others: 26%

**TOTAL**: 203.91 Mn T

**World Exports of 17 Oils & Fats**

- Palm Oil: 55%
- Soyabean Oil: 15%
- Sunflower Oil: 11%
- Others: 14%
- Rapeseed Oil: 5%

**TOTAL**: 79.78 Mn T

Sources: Oil World; MPOB
Production of Major Oils & Fats, 2016

The BIG 4 Edible Oils
- Palm oil
- Soybean oil
- Sunflower oil
- Rapeseed oil

Total Production: 203,908,000 Tonnes

Source: MPOB, 2017

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Global Oils & Fats, 2016

World Major Palm Oil Producers

- Indonesia: 55%
- Malaysia: 30%
- Others: 15%

Total: 58.31 Mn T

World Major Palm Oil Exporters

- Indonesia: 53%
- Malaysia: 37%
- Others: 10%

Total: 43.76 Mn T

Sources: Oil World; MPOB

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Malaysian Palm Oil Board (MPOB)
World Major Palm Oil Producers and Exporters, 2016 (‘000 Tonnes)

**Palm Oil Producing Countries, ‘000 tonnes**

- Indonesia: 31,800
- Malaysia: 17,319
- Thailand: 1,580
- Colombia: 1,130
- Papua New Guinea: 520
- Honduras: 420
- Colombia: 380
- Others: 2,424

**Palm Oil Exporting Countries**

- Indonesia: 23,350
- Malaysia: 16,046
- Guatemala: 623
- Papua New Guinea: 520
- Honduras: 420
- Colombia: 380
- Others: 2,424

Source: MPOB, 2017
World Production & Disappearance of 17 Oils and Fats (‘000 Tonnes)

Disappearance (consumption) increased faster than production

Source: MPOB, 2017
Malaysian Palm Oil Industry
Major Export Products of Malaysia, 2015

Jan - Dec 2015
TOTAL EXPORTS: RM779.95

Ranked 1:
- Electrical & Electronic Products
  - RM277.92 bil
  - 35.6%

Ranked 2:
- Manufactures of Metal
  - RM34.89 bil
  - 4.5%

Ranked 3:
- Machinery, appliances & parts
  - RM36.14 bil
  - 4.6%

Ranked 4:
- Palm Oil
  - RM40.14 bil
  - 5.1%

Ranked 5:
- Crude Petroleum
  - RM26.08 bil
  - 3.3%

- Optical & Scientific Equipment
  - RM26.11 bil
  - 3.3%

- Other Products
  - RM161.72 bil
  - 20.7%

- Rubber Products
  - RM20.18 bil
  - 2.6%

- LNG
  - RM47.07 bil
  - 6.0%

- Petroleum Products
  - RM54.55 bil
  - 7.0%

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Oil palm FRUITS produce two types of oil:

1. Crude Palm Oil from Mesocarp
2. Palm Kernel Oil

Palm Oil at a Glance

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Malaysian Palm Oil Board (MPOB)
Oil Palm is the Most Productive Oil-bearing Crop in the World

**Oil Palm Sustainability**

- Average Oil Yield (t/ha/year)
  - Soybean oil, 0.43
  - Sunflower, 0.65
  - Rapeseed, 0.76
  - Oil Palm, 4.03

**1 hectare produces X amount of oil**

<table>
<thead>
<tr>
<th>Oil</th>
<th>1 hectare produces X amount oil</th>
<th>1 tonne oil needs Y ha land</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPO</td>
<td>4.0</td>
<td>0.25</td>
</tr>
<tr>
<td>SBO</td>
<td>0.4</td>
<td>2.50</td>
</tr>
<tr>
<td>SFO</td>
<td>0.6</td>
<td>1.67</td>
</tr>
<tr>
<td>RSO</td>
<td>0.8</td>
<td>1.25</td>
</tr>
</tbody>
</table>

**Harvested Area (mil ha) vs. Production (mil ton), 2016**

- 18.1 mil ha of land produces 64.67 mil tonnes of palm oil*
  * Including palm kernel oil
- 119.5 mil ha of land produces 51.5 mil tonnes of soybean oil

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Malaysian Palm Oil Board (MPOB)
Oil Palm Planted Area By States, 2016

Malaysia 5.74 Mn Ha
- Pen. Malaysia 2.68 Mn Ha (47%)
- Sabah 1.55 Mn Ha (27%)
- Sarawak 1.51 Mn Ha (26%)

Perlis = 652 ha
Kedah = 87,786 ha
P. Pinang = 14,135 ha
Perak = 397,908 ha
Selangor = 138,831 ha
N. Sembilan = 178,958 ha
Melaka = 56,149 ha
Johor = 745,630 ha
Kedah = 87,786 ha
Selangor = 138,831 ha
N. Sembilan = 178,958 ha
Melaka = 56,149 ha
Johor = 745,630 ha
Kuching = 1,551,714 ha
Sarawak = 1,506,769 ha

Source: MPOB, 2017
Oil Palm Planted Area by Category, 2016

Total Oil Palm Planted Area = 5.74 Mn Ha

Private Estates 3.51 Mn Ha (61.2%)
Independent Smallholders 0.93 Mn Ha (16.3%)
RISDA 0.07 Mn Ha (1.2%)
FELCRA 0.17 Mn Ha (3.0%)
FELDA 0.71 Mn Ha (12.3%)
State Agencies 0.34 Mn Ha (6.0%)
Independent Smallholders 0.93 Mn Ha (16.3%)
Palm Oil Export Revenue, 2016

Total RM64.58 Billion (preliminary)

Palm Oil
RM43.37 Bn (67%)

Palm Kernel Oil
RM4.88 Bn (8%)

Oleochemical
RM12.72 Bn (20%)

Others
RM3.61 Bn (6%)

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Transfer of Knowledge & Technologies
Vision
To become a Nobel Laureate-producing research and development institution, providing leadership and impetus for the development of a highly diversified, value-added, globally competitive and sustainable oil palm industry.

Mission
To enhance the well-being of the Malaysian oil palm industry through excellent research & development and services.

Strategies
- High Income
- Enhancing Sustainability
- Value Addition
Functions of MPOB

• Research & Development
• Services
  • Enforcement & Licensing
  • Transfer of technology & Commercialization
  • Training & Consultancy
  • Resource & Information hub

R&D

- Plantation
- Biotechnology
- Enhancing Sustainability
- Integrated Farming
- Oleo-chemical
- Milling & Processing
- Food & Non-Food Products
- Value Addition

R&D&C
Research & Development & Commercialization

600 Technologies Developed
30% Commercialization Rate

Local | Abroad

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**MPOB International Palm Oil Congress (PIPOC 2017)**

**First Announcement**

**23rd MPOB Transfer of Technology (TOT) 2017**

- **Tuesday, 11 July 2017**
- **MPOB Head Office, Bangi, Selangor**

*To be officiated by YB Datuk Seri Mah Siew Keong, Minister of Plantation Industries and Commodities*

**Locals:** Every year.

**International:** Every 2 years.

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**Malaysian Palm Oil Board (MPOB)**

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Palm Oil: Food Applications

Traditional Foods uses
• Cooking oil
• Industrial Frying Fats
• Margarine
• Shortening
• Vegetable Ghee
• Confectionery Fats
• Ice Cream
• Filled Milk
• Non-Dairy Food Products (Cheese analogue, Creamer)

Naturally Rich With Phytonutrients
• Source of pro-Vitamin A and Vitamin E

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Palm Oil: Food Applications, Value-addition

Palm-based Ice-cream

Santan Sawit

Palm-based Margarine

Palm-based Puff-Margarine

Palm-based yoghurt

Red palm olein Drink (B-Care)

Palm-based vegetarian nuggets

Palm-based mozzarella analogue

Stretchability: a criterion for a good mozzarella cheese for pizza

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Palm Oil: Food Applications, Value-addition

Red palm oil for consumer and industrial products

Red palm oil for Cooking/Salad Oil

Carotino Olein, Superolein, Carofry, Carotino Oil, Natural Palm Carotenes and Tocotrienols Concentrates

Red Palm oil for Shortening, margarine, butter oil substitute

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Palm Oil: Non-food Applications, Value-addition

- **Oleochemical**
Uses of Palm Oil

• 10% oil
• 90% biomass

Oil Palm Biomass Utilization
Utilization of palm fats in broiler feed

Palm-based feeds showed very positive results on the development of broiler chickens

Utilization of palm biomass (EFB, OPF, PKC) in beef cattle feed

Value Addition Strategy

Oil Palm: Biomass for Animal Feeds

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Oil Palm: Biomass applications

**PROPERTIES OF OPT, OPF & EFB FIBRE BUNDLES**
- Fibre quality
- Fibre morphology
- Fibre properties
- Usable fibre fractions

**BOARD OF VARIOUS KINDS**
- MDF
- Plywood
- Moulded particleboard
- Sawn lumber

**PAPER PULP & PAPER PRODUCTS**
- Chemical pulp
- Semi-mechanical pulp
- Mechanical pulp
- Moulded paper products
- Soilless planting medium

**FIBRE REINFORCING COMPOSITES**
- Agrolumber
- Plastic composite

**OTHER PRODUCT TYPES**
- Oil palm heart
- Carbon products
- Carboxymethyl cellulose
- Fine chemicals

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Palm biodiesel meets the international standards (EN 14214 and ASTM D6751)

Summer-Grade Palm Biodiesel
Pour point +15° C

Winter-Grade Palm Biodiesel
Pour point –21° C
Oil Palm: Other Renewable Energy from Biomass

Palm Biomass Briquettes

Bio-Oils From Pyrolysis Process

Palm Derived Bioethanol
Sustainability, Food Safety and Security

Palm Oil Contribution to Global Food Security
Quality Assurance & Certifications of the Malaysian Oil Palm Industry

Oil Palm Supply Chain
What is Food Security?

“Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.

(World Food Summit, 1996)
Land Matters:
• National Land Code 1965
• Land Acquisition Act 1960

Environmental Matters:
• Environmental Land Conservation Act 1960 revised in 1989
• Quality Act 1974 (Environmental Quality) (Prescribed Premises) (Crude Palm Oil) Regulation 1977
• Environmental Quality (Clean Air) Regulation 1978
• Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987

Labour and Employees Matters:
• Labor Law
• Workers’ Minimum Standard of Housing & Amenities Act 1990
• Occupational Safety & Health Act 1977
• Factories & Machinery (Noise Exposure) Regulations 1989

Pesticide Use:
• Pesticides Act 1974 (Pesticides Registration) Rules 1988
• Pesticides (Licensing for sale & storage) Rules 1988
• Pesticides (Labeling) Regulations 1984

Wildlife Matters:
• Protection of Wildlife Act 1972

MPOB licenses all critical activities of the Malaysian oil palm sector and enforces its orderly conduct.
Licensing of Oil Palm Industry by MPOB

25 License Categories

1. Oil Palm Seeds Producer (21)
2. Plants from Oil Palm Tissues Producer (6)
3. Nursery (913)
4. Estate (4,999)
5. Small Holding (221,903)
6. Palm Fatty Acids Dealer (26)
7. Oil Palm Fruit Dealer (2,992)
8. Palm Kernel Dealer (43)
9. Palm Oil Dealer (1,678)
10. Mixed Palm Oil Dealer (504)
11. Palm Oleochemicals Dealer (50)
12. Oil Palm Seeds and Seedlings Dealer (15)
13. Plants from Oil Palm Tissue Dealer (1)
14. Commencement of Construction of Oil Palm Mill (13)
15. Oil Palm Mill (456)
16. Palm Kernel Crushing Factory (64)
17. Palm Oleochemicals Plants (53)
18. Refinery (63)
19. Transporter (446)
20. Commencement of Construction of Bulking Facilities (3)
21. Bulking Facilities (42)
22. Laboratory (30)
23. Surveying of Oil Palm Products (57)
24. Oil Palm Products Exporter (102)
25. Oil Palm Products Importer (129)

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Sustainability Certifications

Four voluntary sustainable certifications been carried out, for large companies and smallholders:

i. Good Agriculture Practices Certification (GAP)

ii. MPOB Code of Practices (CoP)

iii. Malaysian Sustainable Palm Oil (MSPO)

iv. Roundtable Sustainable Palm Oil (RSPO)
Food Safety and Quality: Codes of Practice (COP) of the Malaysian Palm Oil Supply Chain

Sustainable Development

1. Code of Practice for Oil Palm Nurseries
2. Code of Practice for Oil Palm Estates and Smallholdings
3. Code of Practice for Palm Oil Mills
4. Code of Practice for Palm Oil Refineries
5. Code of Practice for Palm Kernel Crushers
6. Code of Practice for the Handling, Transportation and Storage of Oil Palm Products
7. Code of Practice for Bulking Installations

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Malaysian Palm Oil Board (MPOB)
Malaysian Standard on MSPO

- Endorsed by YB Minister of MOSTI on 5th September 2013
- Announced by YAB Deputy Prime Minister on the 19th Nov. 2013
- Launched in 2015

Part 1: General Principle
Part 2: Independent Smallholdings
Part 3: Estates and Organized Smallholdings
Part 4: Mill
Objectives

1. To develop a pragmatic and inclusive standard, which is applicable for all sectors in the supply chain.

2. To ensure sustainable practices are implemented by the oil palm industry.

3. To ensure all palm oil exported from Malaysia is sustainably certified.

4. To ensure smallholders are included in sustainability certification.

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Food Safety & Quality Programs

Pesticides Residues
- Paraquat
- Glyphosate
- Glufisinate ammonium
- Hexaconazole

Developing multi-residue pesticide analysis

Chemical Contaminants
- Hydrocarbon
- PAHs
- Dioxins
- PCB
- Thermal Oil

Process-developed Contaminants
- Acryl Amide
- 2 & 3-MCPD Esters
- Glycidyl Ester

Mycotoxins
- Aflatoxin (palm kernel cake)

Trace Metals
- Cu
- Fe
- etc

Malaysian Palm Oil Board (MPOB)
Mitigation Approaches to address 3-MCPD

**Plantations**
- Reduce chlorine in FFB by changing fertilizers used
- Reduce DAG in PO by ensuring milling within 48 hours – improve quality of CPO
- Wash FFB to remove chlorine precursor
- FFB sterilization with steam without chlorine
- Wash fresh CPO with slightly alkaline water

**Mills**
- Use natural bleaching earths

**Refineries**
- Propose to reduce to the level accepted by all parties
- Reduces deodorisation temperature to below 230 degrees Celsius at vacuum pressure of 1mbar

3-MCPD and GE:
- 3-MCPD ~5-6 ppm
- GE ~ 7-8 ppm

In general:
3-MCPD ~5-6 ppm
GE ~ 7-8 ppm

Malaysian Palm Oil Board (MPOB)
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With the world’s urban population expected to increase by about 60 percent by 2050; we will have a tough time feeding the world.
Palm oil feeds the world

As a sustainable crop, palm oil plays a critical role in helping to feed the world...

- Most Productive
- 10X more Productive than Soybean
- Efficient
- High Output to input Energy Ratio
- Versatile And Cost effective
- Used in 1000s of Food Products Worldwide
- Balanced & Nutritious Oil
- Contains equal Portion of Saturated and Unsaturated Fatty Acids
### Global Nutritional Studies on Palm Oil as a Healthy and Nutritious Oil

<table>
<thead>
<tr>
<th>Region / country</th>
<th>CHD</th>
<th>Palm Vitamin E</th>
<th>Carcinogenes is</th>
<th>Red Palm Oil</th>
<th>Palm Phenolics</th>
<th>Other Studies</th>
<th>Total</th>
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<tbody>
<tr>
<td>USA / Canada</td>
<td>40</td>
<td>27</td>
<td>11</td>
<td>4</td>
<td>-</td>
<td>4</td>
<td>86</td>
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<tr>
<td>Europe</td>
<td>8</td>
<td>4</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Australia</td>
<td>13</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>Asia/ Middle East</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>19</td>
</tr>
<tr>
<td>Africa</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>Malaysia - MPOB</td>
<td>20</td>
<td>16</td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>56</td>
</tr>
<tr>
<td>- Others</td>
<td>6</td>
<td>13</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>106</td>
<td>65</td>
<td>28</td>
<td>18</td>
<td>6</td>
<td>9</td>
<td>232</td>
</tr>
</tbody>
</table>

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Extension Services to Smallholders

Smallholders
Growers who cultivate oil palm on land of less than 40.5 hectares (100 acres)

- To increase smallholders oil palm production and income
- To provide services and disseminate oil palm technologies
- To reduce cost of production
- To increase production efficiency

Smallholder Advisory farm visit
30-Tonner’s Club
Leaders meet smallholder programme
Promotion roadshow for government assistance
Study tour

Technical briefing and method demonstration

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Malaysian Palm Oil Board (MPOB)
Smallholder’s Land Holdings (2016)

Smallholdings: ~40% of total oil palm area

**Private Estates**
- 3.51 Mn Ha (61.2%)

**Independent Smallholders**
- 0.93 Mn Ha (16.3%)

**State Agencies**
- 0.34 Mn Ha (6.0%)

**RISDA**
- 0.07 Mn Ha (1.2%)

**FELCRA**
- 0.17 Mn Ha (3.0%)

**FELDA**
- 0.71 Mn Ha (12.3%)

**Oil Palm Smallholders in Malaysia**

- **234,707 Independent Smallholders**
- **315,293 Organized Smallholders**
- **550,000 Total Smallholders**
Types of Smallholders

Organized Smallholders
- Smallholdings managed by government agencies such as FELDA, FELCRA, RISDA, SALCRA and other state agencies

Total smallholders: 315,293
Total area: 1,268,365 ha

Independent Smallholders
- Independent smallholders are individual farmers who own or leases less than 40 hectares of an oil palm farm and manage the farm themselves.
- Independent smallholders or leases may employ workers to carry out at their farms

Total smallholders: 234,707
Total area: 933,948 ha

Total Smallholders: 550,000
Total area: 2,202,313 hectares
Government’s Assistance for Smallholders

Schemes for Smallholders

- **New Planting Scheme**
  (Skim Tanam Baru Sawit Pekebun Kecil – TBSPK)

- **Replanting Scheme**
  (Skim Tanam Semula Sawit Pekebun Kecil – TSSPK)

- **Cantas Discount Scheme**
  (Skim Diskaun Cantas – SKIDIC)

- **Sustainable Growers Cooperative Scheme**
  (Skim Koperasi Penanam Sawit Mampan – KPSM)

- **Crop Integration Incentive Scheme**
  (Skim Insentif Integrasi Tanaman dengan sawit – ITa)

- **Livestock Integration Incentive Scheme**
  (Skim Insentif Ternakan dengan sawit – ITe)
## Additional Income for Smallholders from Crop Integration

<table>
<thead>
<tr>
<th>Crop</th>
<th>Yield (kg/ha)</th>
<th>Gross Income (RM/ha)</th>
<th>Production Cost (RM/ha)</th>
<th>Net Income (RM/ha)</th>
<th>Integration Duration</th>
<th>Monthly Income (RM/ha/mth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banana (Berangan)</td>
<td>18,810</td>
<td>15,048</td>
<td>6,653</td>
<td>8,395</td>
<td>20 mth</td>
<td>420</td>
</tr>
<tr>
<td>Ground Nut</td>
<td>2,760</td>
<td>3,312</td>
<td>916</td>
<td>1,396</td>
<td>4 mth</td>
<td>349</td>
</tr>
<tr>
<td>Pineapple</td>
<td>31,000</td>
<td>37,200</td>
<td>24,120</td>
<td>13,080</td>
<td>14-16 mth</td>
<td>872</td>
</tr>
<tr>
<td>Soya Bean</td>
<td>2,500</td>
<td>3,750</td>
<td>2,725</td>
<td>1,025</td>
<td>3 mth</td>
<td>240</td>
</tr>
<tr>
<td>Sugar cane</td>
<td>42,200</td>
<td>33,760</td>
<td>15,209</td>
<td>18,551</td>
<td>21 mth</td>
<td>883</td>
</tr>
<tr>
<td>Dhal nut</td>
<td>2,259</td>
<td>3,840</td>
<td>2,108</td>
<td>1,732</td>
<td>5 mth</td>
<td>346</td>
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<tr>
<td>Sorghum</td>
<td>3,400</td>
<td>2,720</td>
<td>1,675</td>
<td>1,045</td>
<td>3 mth</td>
<td>206</td>
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<tr>
<td>Sweet Corn</td>
<td>40,000</td>
<td>12,000</td>
<td>3,178</td>
<td>8,822</td>
<td>3 mth</td>
<td>2,940</td>
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<tr>
<td>Sweet Potato</td>
<td>12,000</td>
<td>6,600</td>
<td>4,246</td>
<td>2,354</td>
<td>4 mth</td>
<td>588</td>
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<td>Silage Sorghum</td>
<td>320,000</td>
<td>22400</td>
<td>11,160</td>
<td>11,240</td>
<td>12 mth</td>
<td>937</td>
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<tr>
<td>Green Bean</td>
<td>4,800</td>
<td>24,00</td>
<td>14,924</td>
<td>9,076</td>
<td>66 days</td>
<td>756</td>
</tr>
</tbody>
</table>
Inclusiveness (Sharing of wealth): Increased Income & Eradication of Poverty

- Oil palm is the Main crop.
- Additional income from crop and livestock integrations

- FELDA Settlers (organized smallholders)
- Independent Smallholders
- National Poverty

Income of smallholders (RM)

- 2007: 2000
- 2008: 2500
- 2009: 3000
- 2010: 3500
- 2011: 4000
- 2012: 4500
- 2013: 5000
- 2014: 4500
- 2015: 4000

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Eradication of Poverty for Oil Palm Smallholders

Felda Settlers: 1960s

Felda Settlers: current
Conclusions

- Oil Palm industry has gone through phenomenal transformation throughout the supply chain: from an ornamental plant to become an industrial crop
- Sources of raw material for global industries for food and non-food applications
- Sharing of wealth to all sectors of industry, including consuming countries
- Huge impact on socio-economic development
- Palm oil is Malaysia’s backbone of the commodity sector, fueling the economic development of the nation
- MPOB will continue strengthening its R&D capability throughout the supply chain to sustain the industry and Malaysia’s GOLDEN CROP