2016 BUSINESS AND BIODIVERSITY FORUM
Mainstreaming Biodiversity: Opportunities for Businesses

Session E
Supply Chains and sustainable production and consumption

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President, Saraya Co. Ltd
Main Topics

1. BCT (Borneo Conservation Trust)
2. RSPO
3. Create More Values by the Palm Mill
Palm Oil is used in many food products

90% of Palm Oil is used for food
SARAYA  Soap and Detergents

Consumer

B to B
Oil palm

Oil palm fruits

Size: 4-5cm

Palm Oil  Palm Kernel oil
The production of main 10 vegetable oils

Worldwide vegetable oil production
(Oil world 2016)

Average yearly harvest yield per hectare
(FAO Statistics Division, May 2015)

Stated yields represent bulk fruit harvest. Oil content is approximately 20-30% for oil palm, 20% for soybean, and 40% for rapeseed and sunflower seed.
Global vegetable oil production

production of palm oil country

(FAOSTAT)
Green areas represent rainforest. Around 30 years ago this entire area was covered in native rainforest. It was paradise for wildlife.

Orange areas represent palm plantations. Now there is very little rainforest remaining, limited to a small area along the main river.
Roundtable on Sustainable Palm Oil

Started in Dec. 2003 by 7 members
SARAYA Joined on Jan. 17, 2005

RSPO members
3,080

Trademark Licenses issued by RSPO
429
SARAYA contributes 1% of “Happy Elephant” and “Yashinomi detergent” brands products in support of the Borneo rainforest.
BCT is officially approved as the Trust in Sabah Malaysia on Oct. 16, 2006
Aug. 1, 2004

TV Asahi program “The tear of a small elephant” brought awareness of the suffering of the elephants.
Research Mission done by Mr. Nobuo Nakanishi in Nov, 2004
Rescue Members of Sabah Wildlife Department
Board Meeting of BCT on Sep. 12, 2006, Kota Kinabalu,

BCT was approved in next month Oct. 2006
Continue the rescue of elephants
The forest in Sabah

- Permanent forest
- Reserved forest
- Not reserved area
- Plantation and private land

Kinabatangan river
Segama river
The lower Kinabatangan River Region was used to be covered by dense rain-forests which are still home to the Borneo Orangutans, the Borneo Elephants and many other animals. However result of vast deforestation, most of the forests are now turned into palm-oil plantations (colored : light pink). As it is shown in the map, the forests marked as Protected Areas and Forest Reserves (colored : dark green) are scattered along the river. Since the forests are not connected, the Borneo Orangutans are stuck in one area and unable to move to other areas to meet potential partners for breeding. It is scientifically reported that the Borneo Orangutans in these areas are at risk of extinction in the next 50 years. The Borneo Elephants regularly migrate along the river and they sometimes go into the palm-oil plantations and local farm lands. Consequently they damage the local crops. This leads to conflicts between elephants and people and as a result adult elephants are shot to death and babies are left to be orphans.

It is an urgent issue to establish the Green Corridor to connect the protected areas so that the animals can move around freely and that will help to conserve the biodiversity upon which they rely.

20,000 ha of land is needed for establishing the Green Corridor. The Borneo Orangutans, the Borneo Elephants and many other animals are in a great danger. Please join us and become a partner to conserve the ecosystems in the Borneo Rain-forest.
2nd Stage Borneo Elephant Sanctuary inaugurated on Sep 19th, 2013
Sep. 19th, 2013 Borneo Elephant Sanctuary
Renewable energy creation in the plantation: The biomass

- FFB (Fresh Fruits Bunch)
- SFL (Sterilled Fruitlet)
- CPO (Crude Palm Oil)
- POME (Palm Oil Mill Effluent)
- PKS (Palm Kernel Shell)
- MF (Mesocarp Fiber)
- EFB (Empty Fruits Bunch)

unused resources
製品
PKS (Palm Kernel Shell)
POME (Palm Oil Mill Effluent)
EFB (Empty Fruits Bunch)
MF (Mesocarp Fiber)

【そのまま利用】

Pellet
Briquette
Baler
Biogas
### Economic Effects of New Resource Creation (A)

#### In a Case of the Mill of 60t/h (FFB), about 10,000ha

<table>
<thead>
<tr>
<th>Item</th>
<th>Volume</th>
<th>Use at Mill</th>
<th>Sales Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFB</td>
<td>63,360t/y</td>
<td>63,360t/y</td>
<td>0t/y</td>
</tr>
<tr>
<td>MF</td>
<td>39,000t/y</td>
<td>39,000t/y</td>
<td>0t/y</td>
</tr>
<tr>
<td>PKS</td>
<td>15,300t/y</td>
<td>2,160t/y</td>
<td>13,140t/y</td>
</tr>
<tr>
<td>POME</td>
<td>187,100t/y</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

#### Palm Pellet Production

<table>
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<td>EFB</td>
<td>63,360t/y</td>
<td>0t/y</td>
<td>63,360t/y</td>
</tr>
<tr>
<td>MF</td>
<td>39,000t/y</td>
<td>16,600t/y</td>
<td>22,400t/y</td>
</tr>
<tr>
<td>PKS</td>
<td>15,300t/y</td>
<td>2,160t/y</td>
<td>13,140t/y</td>
</tr>
<tr>
<td>POME Electric</td>
<td>187,100t/y</td>
<td>-</td>
<td>0MWh/y</td>
</tr>
<tr>
<td>POME Gas</td>
<td></td>
<td>All Generation</td>
<td>0Nm3/y</td>
</tr>
<tr>
<td>POME Pellet</td>
<td></td>
<td>All Gas</td>
<td>0t/y</td>
</tr>
</tbody>
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※The purchase period in the FIT scheme is 16 years in Malaysia.
### Economic Effects of New Energy Creation (B, C)

#### In a Case of the Mill of 60t/h (FFB) Scales

<table>
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<tr>
<th>Item</th>
<th>Volume</th>
<th>Use at Mill</th>
<th>Sales Potential</th>
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</thead>
<tbody>
<tr>
<td>Business As Usual</td>
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</tr>
<tr>
<td>EFB</td>
<td>63,360t/y</td>
<td>63,360t/y</td>
<td>0t/y</td>
</tr>
<tr>
<td>MF</td>
<td>39,000t/y</td>
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<td>PKS</td>
<td>15,300t/y</td>
<td>2,160t/y</td>
<td>13,140t/y</td>
</tr>
<tr>
<td>POME</td>
<td>119,136t/y</td>
<td>-</td>
<td>-</td>
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</table>

#### Methane Fermentation System

<table>
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<td>2,160t/y</td>
<td>13,140t/y</td>
</tr>
<tr>
<td>POME</td>
<td>119,136t/y</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Electric</td>
<td></td>
<td>All Electric Case</td>
<td>51,946MWh/y</td>
</tr>
<tr>
<td>- Gas</td>
<td></td>
<td>All Gas Case</td>
<td>8,628,600Nm3/y</td>
</tr>
<tr>
<td>- Pellet</td>
<td></td>
<td></td>
<td>10,047t/y</td>
</tr>
</tbody>
</table>

※The purchase period in the FIT scheme is 16 years in Malaysia.
Proposal of New Energy Creation

Balance Sheet of the Methane Fermentation System

A Case of 60 t-FFB/h, Standard Mill

- **In Mill**
  - 3t/h
  - 1600kW
  - 17.5t/h
  - 20t/h

- **Products**
  - 1.2t/h
  - 0.5t/h

- **New Energy Creation (B, C)**
  - 450kW
  - 1000Nm³/h

**Mill (FFB100)**
- MF (14)
  - 8t/h
- EFB (22)
  - 7t/h
- POME (65)
  - 14t/h

**PKS (5)**
- Boiler
- Header
- TG
- Sterilizer

**New Energy Creation (B, C)**
- Fermentation
  - Biogas
  - Digestate
- Refine
- Screw Press
- CNG
- Solid
- Waste Water
- Water Treatment
- Dryer & Press

**To Sell**
- Electricity
- CNG

**Steam**
- Solid
- Heat
- Electricity
**Product**

**Pellet**

- **Size**: Φ8~10mm
- **Energy density**: 3,800~4,400 kcal/kg

Methane fermentation to create methane gas.

**Conclusion**: SARAYA wish to propose a new Criteria for RSPO to reduce methane gas by new fermentation tank and utilize the unused biomass for the pellet. The pilot experiment is now is starting in 2016.