**OPPORTUNITIES & CHALLENGES
IN ICT DEVELOPMENT**
FOR THE PLANTATION INDUSTRY

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FOR THE PLANTATION INDUSTRY
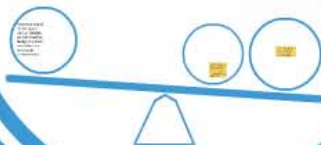
Makhdzir Mardan

A

RATIONALE FOR ICT INNOVATIONS, MILESTONES IN PLANTATION INNOVATIONS & ICT INNOVATIONS IN MALAYSIA

RATIONALE on Why the Malaysian palm oil industry must embrace ICT for productivity;

3 Status of ICT innovations in the plantation sector

5 Plantation need ICT enabler to production

2 Historical Milestones in the Innovation of the Oil Palm Plantation industry

4 Comparative ICT innovations to other industrial sectors

• Comparative utilization of ICT innovations to improve productivity between manufacturing, agriculture, medicine, etc.

• To alleviate and reduce dependence on human labour via robotics & automation;

• To improve competition in plantation

1

RATIONALE on Why the Malaysian palm oil industry must embrace ICT for productivity;

DIGITAL ECONOMY:
The in-thing on
DIGITAL ECONOMY
towards 2050
**(robotics &
automation, real-
time sensed data
in oil palm big
data**, etc.);

**IMPROVED
PRODUCTIVITY:**
Improve palm oil industry's productivity
via efficiency of real-time information
flow on the palm oil big data
(traceability, sensors for real-time
monitoring, exoskeleton-enabled
wearable sensors, etc.); decision-making
in rubber wood harvest.

COMPETITIVENESS:
Improve competitiveness,
cost effectiveness and
ease of sharing
information for greater
relevance, comparative
analyses, and prompter
decisions-decision &
implementation plans

**REGIONAL ASEAN
FOOTPRINT & BUSINESS
CAUCUS:**

**TRACEABILITY
SYSTEM:**

IMPROVED PRODUCTIVITY:

Improve palm oil industry's productivity **via efficiency of real-time information flow on the palm oil big data** (traceability, sensors for real-time monitoring, exoskeleton-enabled wearable armour, etc.); decision-making in rubber wood harvest.
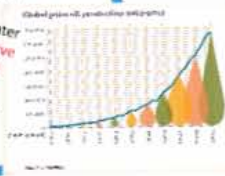
DIGITAL ECONOMY:

The in-thing on **DIGITAL ECONOMY** towards 2050 (**robotics & automation, real-time sensed data in oil palm big data**, etc.);

COMPETITIVENESS:

Improve competitiveness, cost effectiveness and ease of linking information for greater relevance, comparative analyses, and prompt business decisions & implementation plans;

REGIONAL ASEAN FOOTPRINT & BUSINESS CAUCUS:

CPOPC

TRACEABILITY SYSTEM:

DIGITAL ECONOMY:

The in-thing on **DIGITAL ECONOMY** towards 2050 (**robotics & automation, real-time sensed data in oil palm big data**, etc.);

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Improve palm oil industry's productivity **via efficiency of real-time information flow on the palm oil big data** (traceability, sensors for real-time monitoring, exoskeleton-enabled wearable armour, etc.); decision-making in rubber wood harvest.

PRODUCTIVITY:

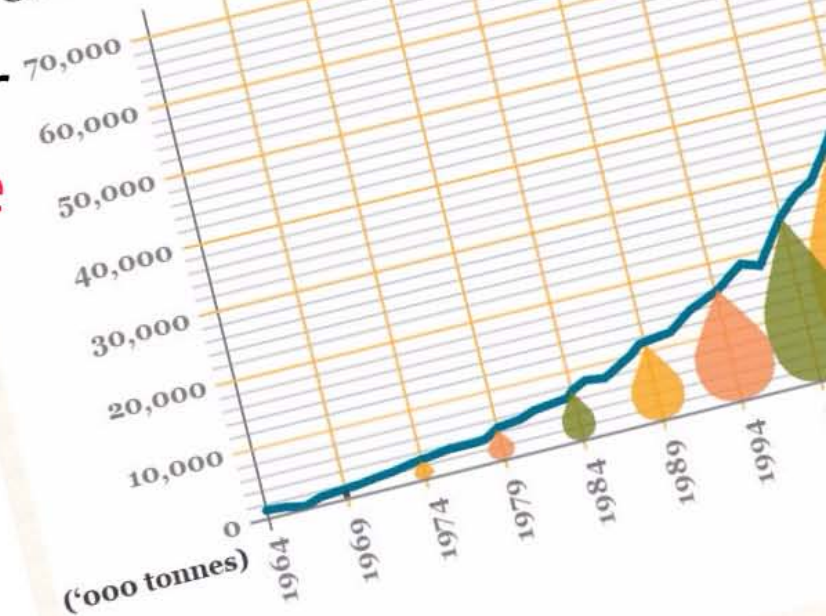Improve palm oil industry's productivity **via efficiency of real-time information flow on the palm oil big data** (traceability, sensors for real-time monitoring, exoskeleton-enabled wearable armour, etc.); decision-making in rubber wood harvest.

COMPETITIVENESS:

Improve competitiveness, cost effectiveness and ease of linking information for greater relevance, comparative analyses, and prompt business decisions & implementation plans;

Global palm oil production 1964-2014

70,000	
60,000	
50,000	
40,000	
30,000	
20,000	
10,000	
0	

('ooo tonnes) 1964 1969 1974 1979 1984 1989 1994

Source: IndexMundi

REGIONAL ASEAN FOOTPRINT & BUSINESS CAUCUS:

ASEAN Member Countries

Myanmar

Laos

Thailand

Philippines

Cambodia

Vietnam

Malaysia

Brunei Darussalam

Indonesia

Singapore

Malaysia and Indonesia (via **CPOPC**) must be on the same page on many critical issues & policies;

Teamship between Malaysia, Indonesia & Thailand (91% of the world's producers); ca. 55 million tons, annually) is to be established under the **ASEAN platform**;

COUNCIL OF PALM OIL PRODUCER COUNTRIES

CPOPC

TRACE

Malaysia and Indonesia (via **CPOPC**) must be on the same page on many critical issues & policies;

Teamship between
Malay~~si~~

Teamship between Malaysia, Indonesia & Thailand (91% of the world's producers); ca. 55 million tons, annually) is to be established under the **ASEAN platform**;
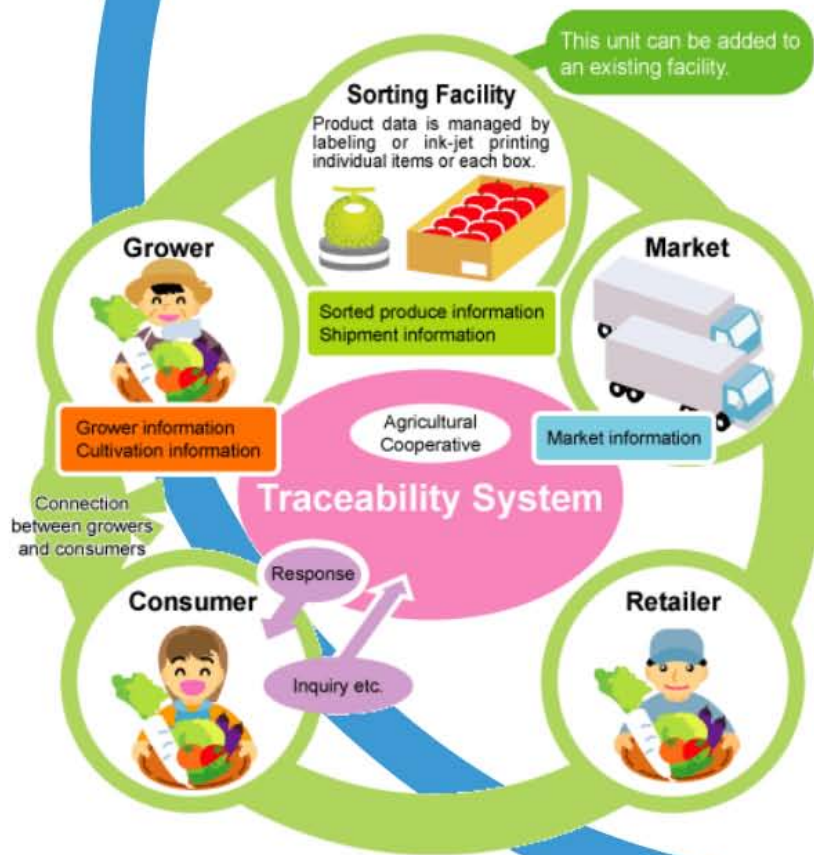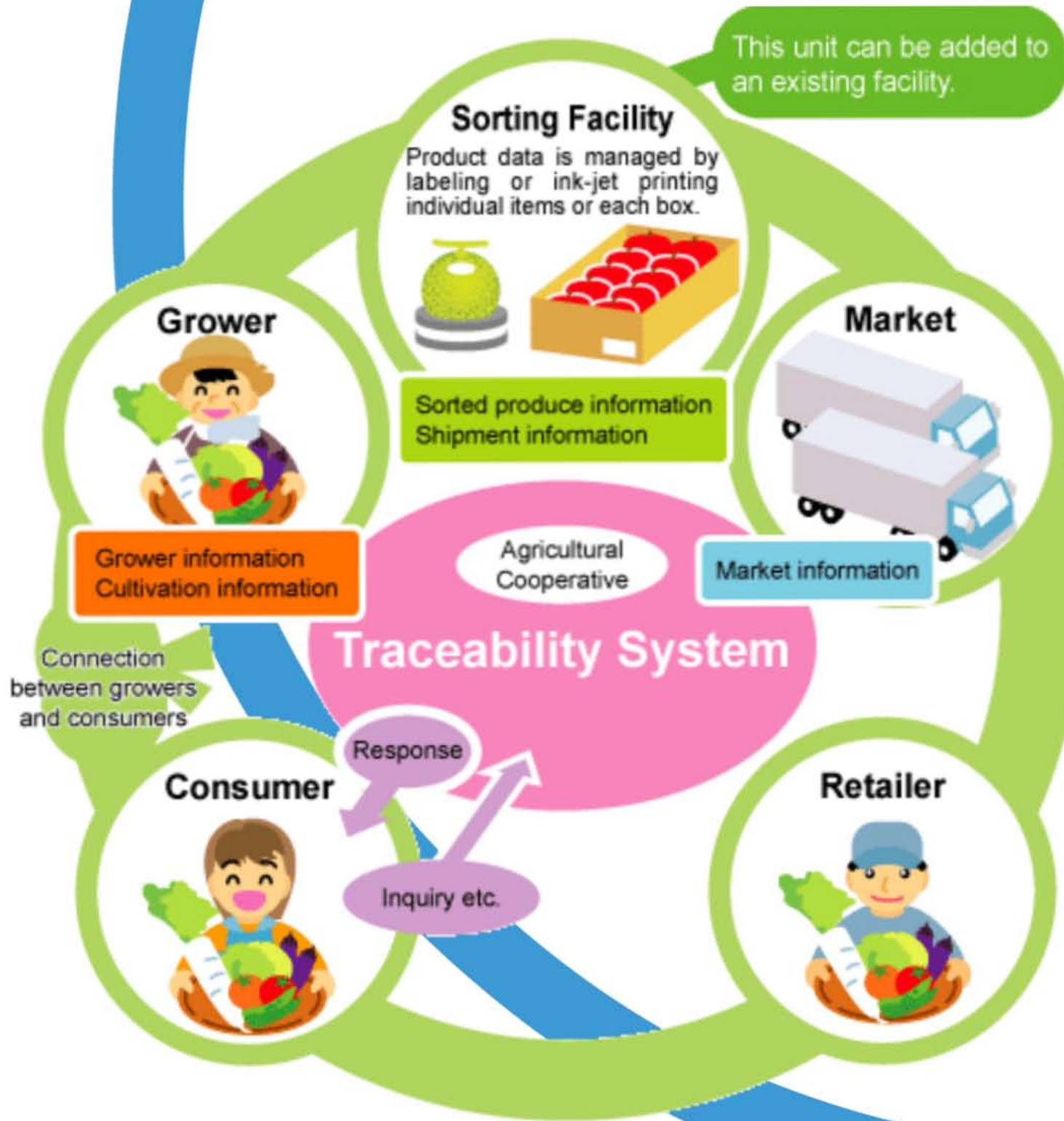
TRACEABILITY SYSTEM:

This unit can be added to an existing facility.

Sorting Facility
Product data is managed by labeling or ink-jet printing individual items or each box.

Sorted produce information
Shipment information

Grower

Grower information
Cultivation information

Market

Market information

Agricultural Cooperative

Traceability System

Connection between growers and consumers

Consumer

Response

Inquiry etc.

Retailer

SATELLITE COMMUNICATIONS

TERRESTRIAL BROADCAST

MOBILE

Intermodal Communications

Navigation

MAN

Vehicle-to-Vehicle

Safety Systems

Traffic Signs

Passenger Information

WLAN

Travel Assistance

Adaptive Cruise Control

Trip Planning

©ETSI 2008

Fleet Management

Toll Collection

Traceability and logistics / consignment/transportation of CPO supply chains for export;

This unit can be added to an existing facility.

Sorting Facility
Product data is managed by labeling or ink-jet printing individual items or each box.

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BROA

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©ETSI 2008

Traceability and logistics / consignment/transportation of CPO supply chains for export;

Traceability and logistics / consignment/transportation of CPO supply chains for export;

Intermodal Communications

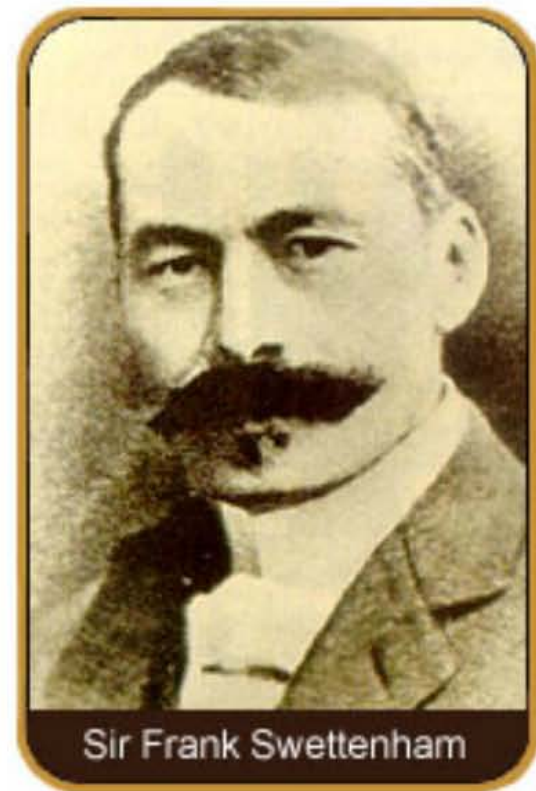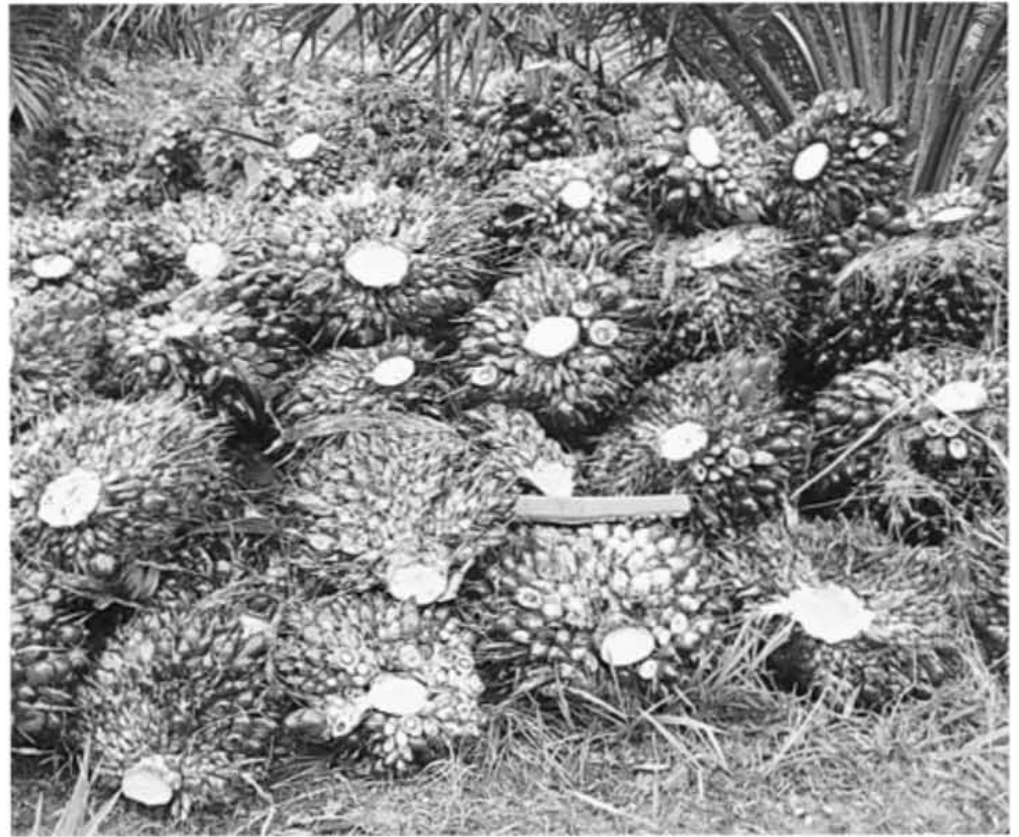# Historical Milestones in the Innovation of the Oil Palm Plantation industry

2

1872
Scores of oil palm seeds were biogeographically introduced into Malaysia by explorers during the colonial era of Frank Swettenham

1982
First batch of *Elaeidobius kamerunicus* (palm oil weevils) were introduced into Malaysia to assist the pollination of oil palm plantations and replaced high emerged, human pollinator, an increase of 15% yield ca. + RM 200 millions annually.

2014
The complete mapping of the oil palm genome by Sime Darby and later by MPOB, discovery of the shell genes ca. + RM 420 million was invested by several companies to map to all palm genome (AVOT, SIME DARBY, Felda, etc.) commendatory competition should have been collaborative attempt.

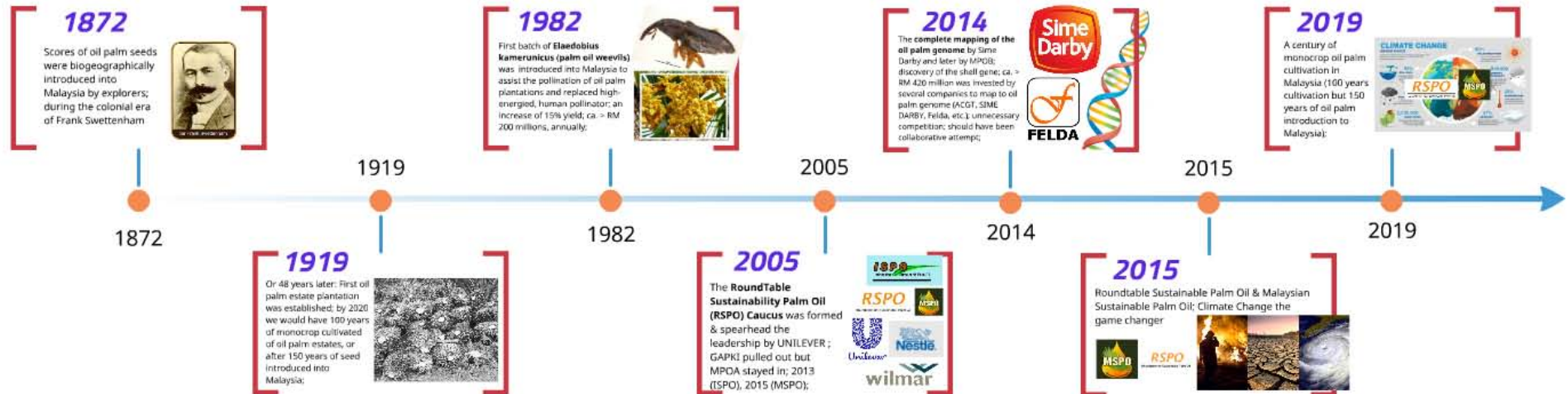**2019**
A century of monocrop oil palm cultivation in Malaysia (100 years cultivation but 150 years of oil palm introduction to Malaysia)

1919
Or 45 years later. First oil palm estate plantation was established. by 2020 we would have 100 years of monocrop cultivated of oil palm estates, or after 150 years of seed introduced into Malaysia.

2005
The RoundTable Sustainability Palm Oil (RSPO) Caucus was formed & spearhead the leadership by UNILEVER; GAPKI pulled out but MPOA stayed in 2013 (RSPO, 2015 (MSPO)).

2015
RoundTable Sustainable Palm Oil & Malaysian Sustainable Palm Oil; Climate Change the game changer

Timeline: 1872 — 1919 — 1982 — 2005 — 2014 — 2015 — 2019

Palm Plantation industry

1872

Scores of oil palm seeds were biogeographically introduced into Malaysia by explorers; during the colonial era of Frank Swettenham

1982

First batch of **Elaedobius kamerunicus (palm oil weevils)** was introduced into Malaysia to assist the pollination of oil palm plantations and replaced high-energied, human pollinator; an increase of 15% yield; ca. > RM 200 millions, annually;

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The **complete mapping of the oil palm genome** by Sime Darby and later by MPOB; discovery of the shell gene; ca. > RM 420 million was invested by several companies to map to oil palm genome (ACGT, SIME DARBY, Felda, etc.); unnecessary competition; should have been collaborative attempt;

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Sir Frank Swettenham

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Status of ICT innovations in the plantation sector

More than 80% of the Malaysian palm oil estates **are not internet-ready**; only those near towns are fortuitously, internet-ready;

4

plantation sector

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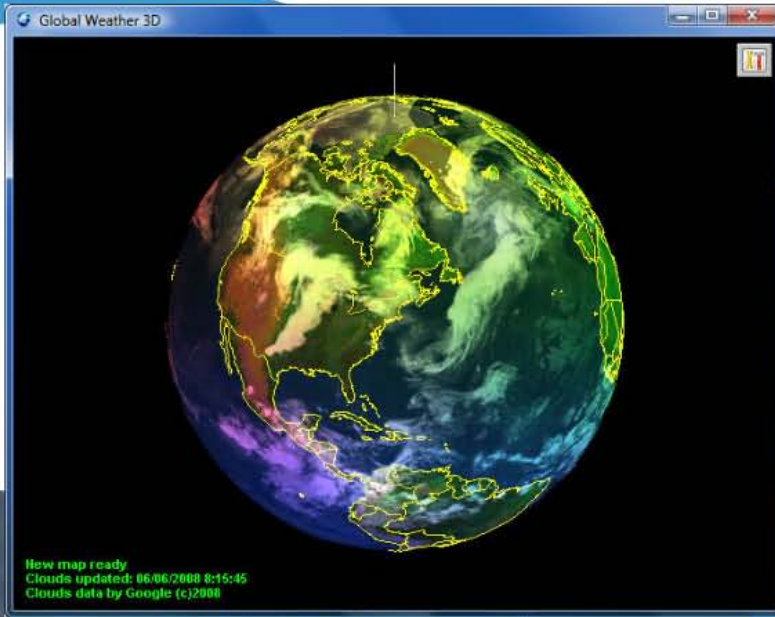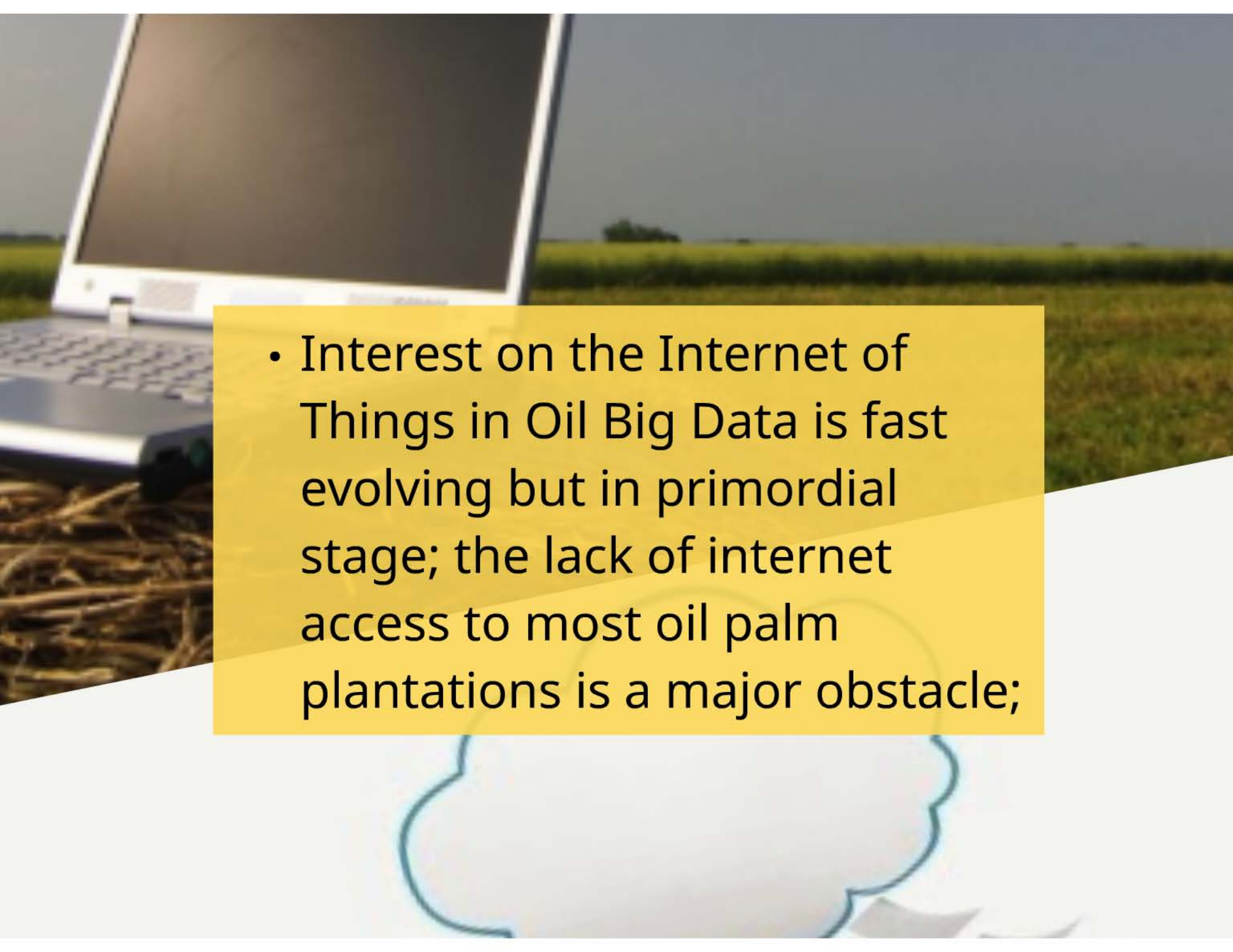
- Satellite & Drone-enabled Remote-sensing: photo scans were used to determine the plantation boundaries, Digital Elevation Mapping (DEM), palm tree counting, land preparation, disease diagnosis, pests & aerial spray of diseases, disease, fertilizer broadcasts & ultra-low volume, aerial spraying; planting spots (coordinates);

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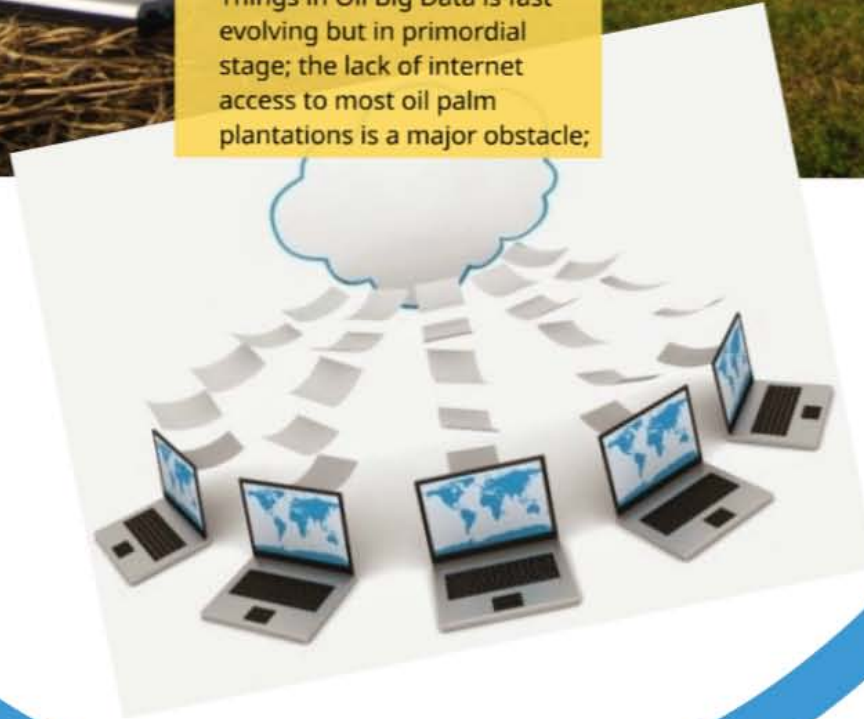
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Comparative ICT innovations to other industrial sectors

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- Comparative utilization of ICT innovations to improve productivity between manufacturing, agriculture, medicine, etc.

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5 Plantation sector need ICT as an enabler to improve productivity?

- To alleviate and reduce dependence on human labour via robotics & automation;

- To improve productivity & competitiveness of the oil palm plantation industry

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▪ *To alleviate and reduce dependence on human labour via robotics & automation;*

1:20 labour-to-land ratio & target foreign workers of 15, 500 by 2020 (?); go for **exoskeleton to carry heavy weights**

297 000 registered migrant workers to be significantly reduced to more than half of what we are having now;

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Fertiliser application

P&D spraying

...uce labour ...ation;

- *To improve productivity & competitiveness of the oil palm plantation industry*

- Escalating acquisition & production costs of human labour and the associated social baggage; increased labour acquisition costs at RM 2200/ worker;
- Labour sustenance RM 75/day; minimum wage at RM 1000/month since July 2016;

- Moratorium on foreign labour recruitment since early 2016 and lifted in June 2016; Labour Scarcity still persists

To keep away from the vulnerabilities that are associated with human labour; going for mechanization, robotics and automation is a two-prong objective; establish the ICT and internet infrastructure;

- GPS Tracker; to monitor the movement of transporting tanker of CPO from mills to the ports;

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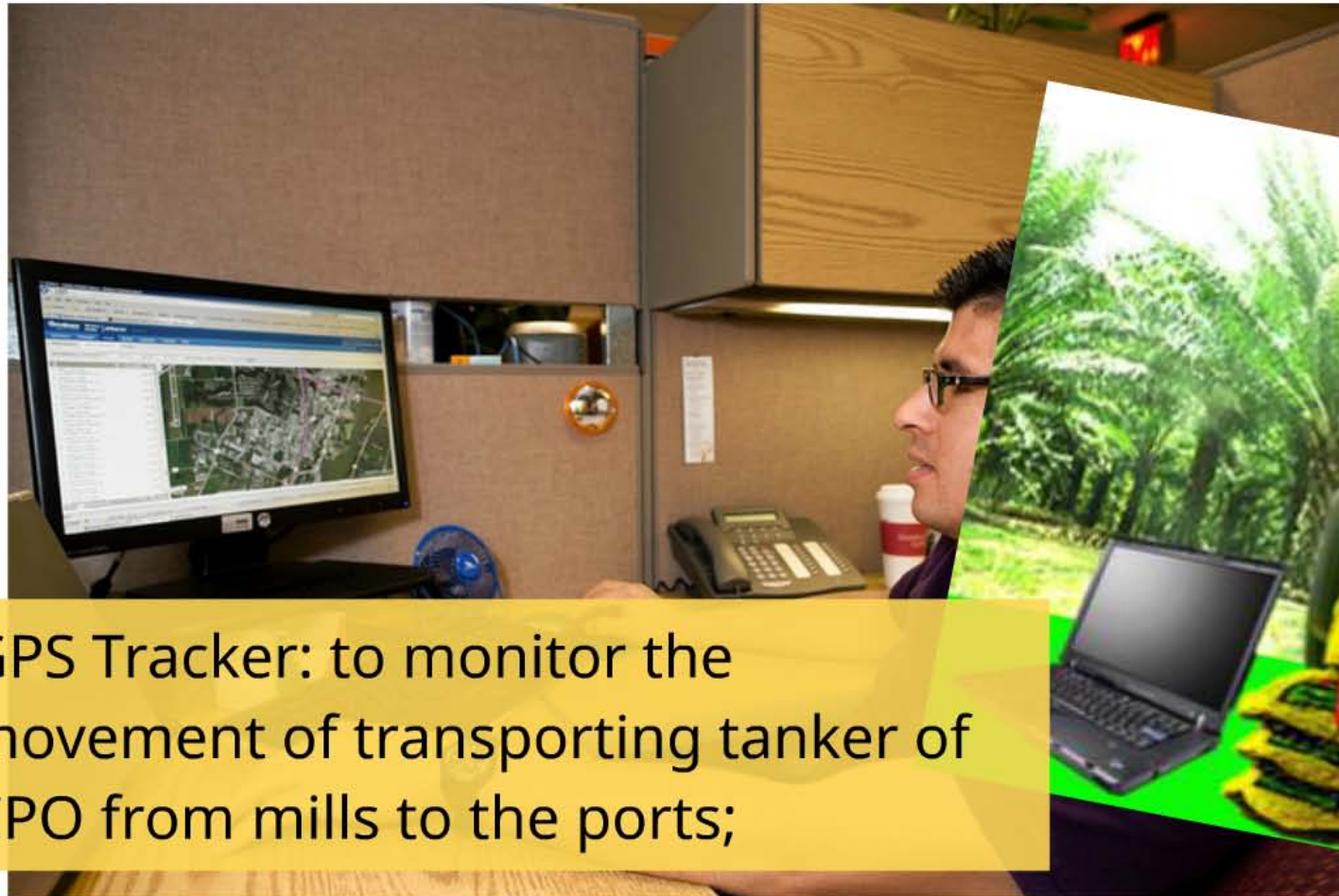
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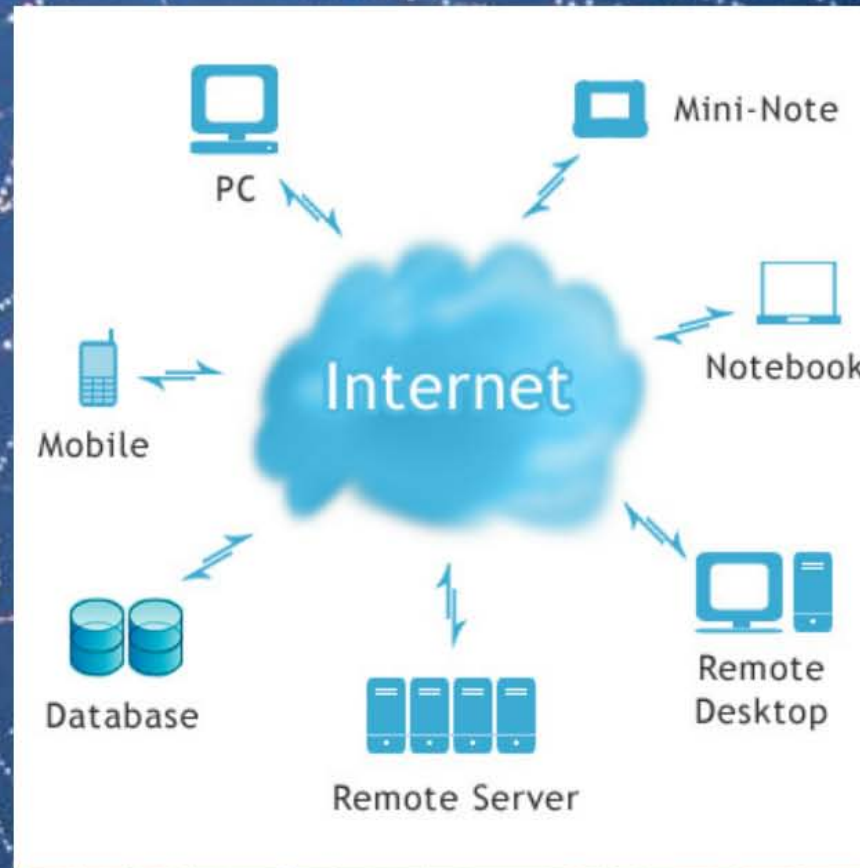
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2. Historical Milestones in the Innovation of the Oil Palm Plantation industry

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TARGET AREAS IN ICT INNOVATIONS FOR THE OIL PALM PLANTATION SECTOR

Satellite, or Drone-enabled Replanting land preparation via remote-sensing (satellite/drone-enabled): for land preparation, plantation boundaries and plantation replanting, palm tree counting, planting terrace construction.)

2015/03/19 16:40:17

Satellite, or Drone-enabled Replanting land preparation via remote-sensing (satellite/ drone-enabled): for land preparation, plantation boundaries and plantation replanting, palm tree counting, planting terrace construction.)

Office automation and intranet system:

1

Oil Palm Big Data:

2

Autonomous tractors & bulldozers:

3

4

Monitoring and surveillance

5

Remittance via phone banking

6

1

Office automation and intranet system:

To network the financial system and comply with the International Financial Reporting System (IFRS 411) with features on traceability system.

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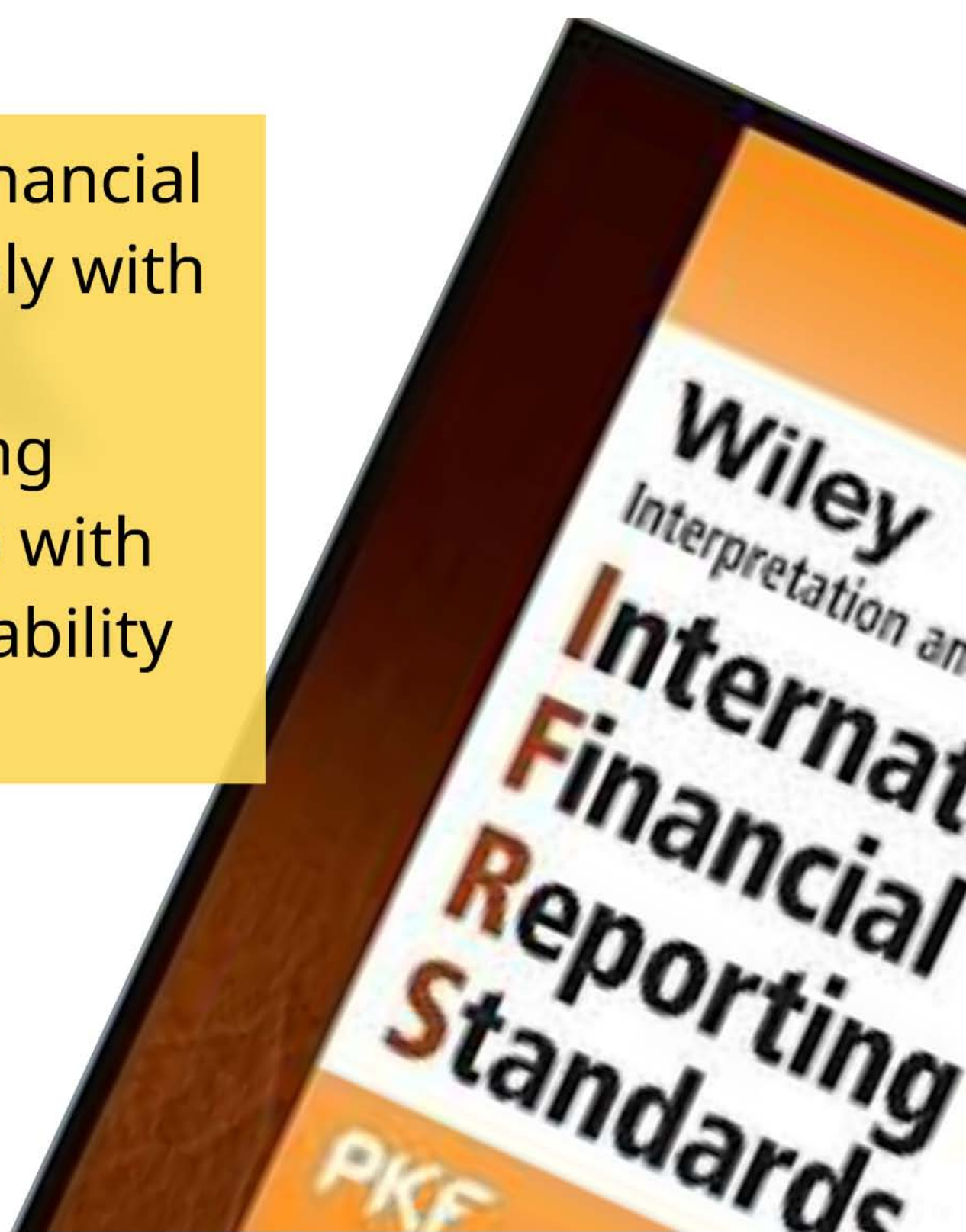
Oil Palm Big Data:

Palm Oil Manufacturing

The use of field sensors to enable a real-time data transfer for accuracy and online decisions. Supply chain connectivity

PO is **transported** from the refineries to manufacturing facilities

Manufacturing
Palm oil is now incorporated into hundreds of products from soap to cookies

The PO is refined and separated at the **refineries**

Crude PO is then **shippped** to the refineries

2

The use of field sensors to enable a real-time data transfer for accuracy and online decisions. Supply chain connectivity

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3 *Autonomous tractors & bulldozers:*

For hill terrace construction & planting point preparation, via GPS-equipped tractors (gambar tractor sand autonomous bulldozers)

For hill terrace construction & planting point preparation, via GPS-equipped tractors (gambar tractor sand autonomous bulldozers)

4

Drone-enabled, aerial insecticide spraying, fertilizer broadcast & disease diagnostics: R&D activities need to be upscaled and financial grant should be increased.

Drone-enabled, aerial insecticide spraying, fertilizer broadcast & disease diagnostics: R&D activities need to be upscaled and financial grant should be increased.

Monitoring and surveillance

5

Monitoring and surveillance on wild life intrusions along plantation boundaries (elephants): Periodic monitoring and surveillance on intrusion by wild life that destroy oil palm plantation.

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6 Remittance via phone banking

To seize the business opportunity in the services-related business in billings & remittances (medical/ hospital/ insurance/ electricity/ utilities/ etc.)

To seize the business opportunity in the services-related business in billings & remittances (medical/ hospital/ insurance/ electricity/ utilities/ etc.)

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TARGET AREAS IN ICT INNOVATIONS FOR THE OIL PALM PLANTATION SECTOR

A

RATIONALE FOR ICT INNOVATIONS, MILESTONES IN PLANTATION

C

WHAT ARE THE PRE-REQUISITES & OPPORTUNITIES TO FOUND & FOSTER ICT INNOVATIONS FOR COMPETITIVENESS OF THE PLANTATION INDUSTRY?

1 CONNECTING THE OIL PALM INNOVATION SUPPLY CHAINS IN STRATEGIC AREAS

2 ALIGNING THE RELEVANT STAKEHOLDERS in FOREIGN WORKER RECRUITMENT:

3 Provide Incentives, rewards and Tax Breaks for Oil Palm Plantation companies to be involved.

1

CONNECTING THE OIL PALM INNOVATION SUPPLY CHAINS IN STRATEGIC AREAS
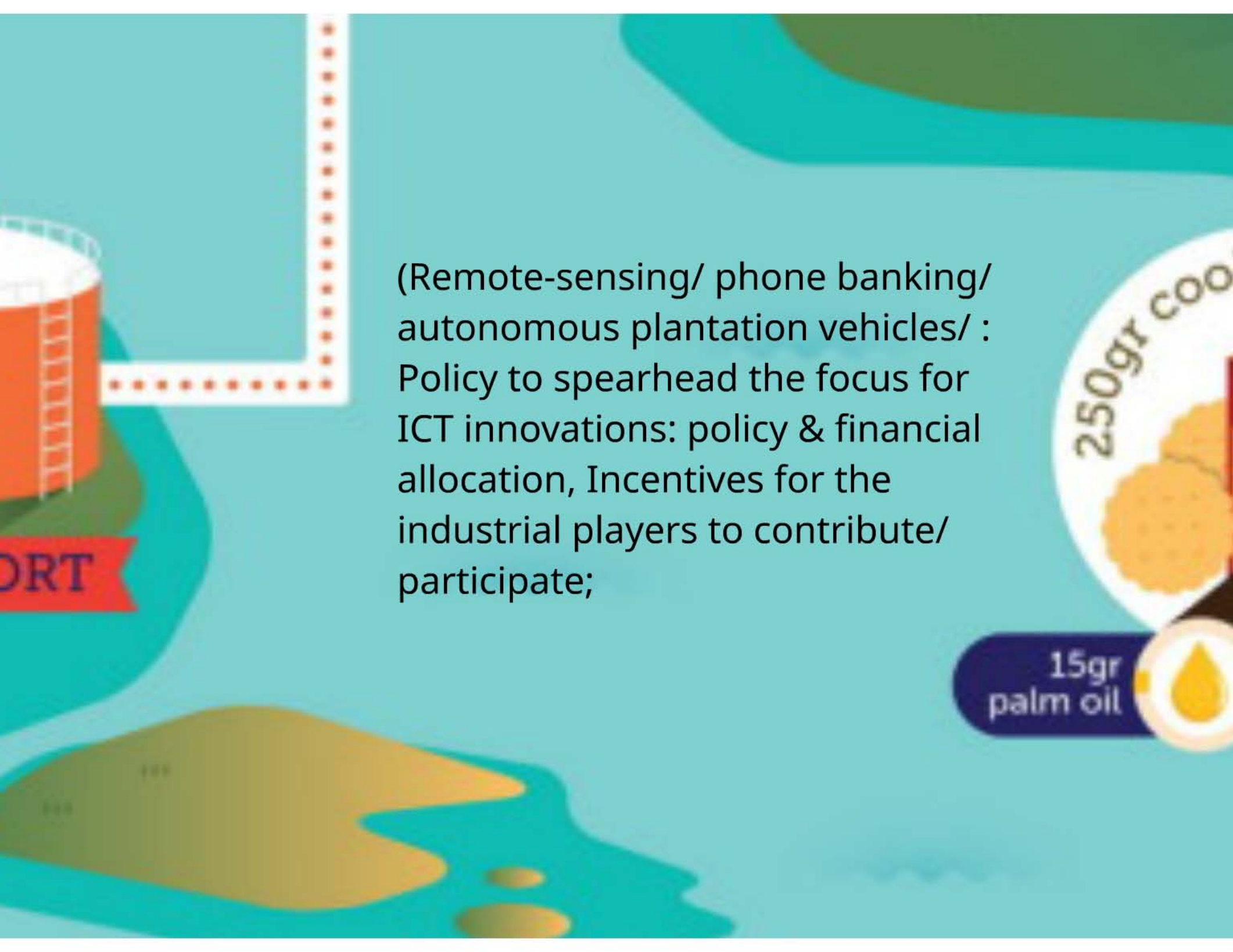
2

PALM OIL
SUPPLY CHAIN

NOTE: Volumes in this infographic are averages.
There is a lot of variation in processing, transport capacity, and ingredient use.

REFINERY
/FRACTIONATION PLANT

200,000 tonnes

100 tonnes /hour

80% olein

20% stearin

PLANTATION
FRESH FRUIT BUNCH (FFB)

25kg

COLLECTION PORT

MARGARINE
MANUFACTURER

45,000 tonnes

250gr margarine

100gr palm oil

200,000 tonnes

(Remote-sensing/ phone banking/ autonomous plantation vehicles/ :
Policy to spearhead the focus for ICT innovations: policy & financial allocation, Incentives for the industrial players to contribute/ participate;

250gr cookies

COLLECTION PORT

MILL

18 tonnes palm oil / hour

15gr palm oil

90 tonnes FFB /hour

COOKIE
MANUFACTURER

(Remote-sensing/ phone banking/ autonomous plantation vehicles/ : Policy to spearhead the focus for ICT innovations: policy & financial allocation, Incentives for the industrial players to contribute/ participate;

250gr coo

15gr
palm oil

ORT

ALIGNING THE RELEVANT STAKEHOLDERS in FOREIGN WORKER RECRUITMENT:

2

(Plantation conglomerates, KDN, TREASURY (Reconfigure tax structure for green economy),Insurance companies (TAKAFUL, etc,);
MPIC (MPOB, MPOC, MPOCC), KDN FOREIGN WORKERS RECRUITMENT AGENCIES, HUMAN RESOURCE MINISTRY, IMMIGRATION DEPT, TREASURY (SOCSO, EPF, etc.), MDEC (MSC infrastructure), MCMC, TELCOS, BANKS (local & foreign), INSURANCE COMPANIES, IMMIGRATION DEPT, Ministry of HEALTH (FOMEMA), JPJ (Driving license renewal),

Key Institutions for ICT establishment: MPIC, HRM, MDEC (MSC), Institutions of Higher Learning:

To convene & coordinate the relevant stakeholders into positions for collaboration & connectivity; (gambar KDN logo, FELDA, SIME EPF, SOCSO, TAKAFUL INSURANCE)

PERKESO

IKHLAS

Internet & broadband Infrastructure for internet-ready to access by all plantations:

(Plantation conglomerates, KDN, TREASURY (Reconfigure tax structure for green economy),Insurance companies (TAKAFUL, etc,);
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PERKESO

Takaful
IKHLAS

Internet & broadband Infrastructure for internet-ready to access by all plantations:

Currently, an estimated of **less than 20% of the Malaysian oil palm estates are in immediacy to access onto the internet** and this is the keystone issue on why ICT innovations do not take a foothold in the Malaysian oil palm plantations;
without access to the internet does not make the plantation life attractive to the millennials;
MDEC (MSC) and MCMC must stride into position to erect the ICT infrastructure in the oil palm plantations.

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Provide Incentives, rewards and Tax Breaks for Oil Palm Plantation companies to be involved.

- Incentives, tax rebates and reallocation of allowance must be installed to spur incentives to oil palm plantation companies to embrace ICT utilization for productivity.
- Provide Infrastructural and info-structural support for the plantation industry;
- Extend the reallocation of investment fund as innovation incentive;
- MDEC and MSC should participate to found the infrastructure for ICT in oil palm plantations;

MSC MALAYSIA

Status Company

MDEC

Driving Transformation

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1 SHARE INFORMATION, IDENTIFY NEEDS & BUILD CUSTOMISED, DIGITAL APPLICATIONS FOR THE PALM OIL BUSINESS ECOSYSTEM & SUPPLY CHAINS:

3 *Testbed Projects:*

2 IDENTIFYING GAPS & NODES ON THE PALM OIL SUPPLY CHAINS & INSTAL THE INFRASTRUCTURE FOR THE INTERNET OF THINGS TO FLOURISH FOR THE PALM OIL INDUSTRY:

SHARE INFORMATION, IDENTIFY NEEDS & BUILD CUSTOMISED, DIGITAL APPLICATIONS FOR THE PALM OIL BUSINESS ECOSYSTEM & SUPPLY CHAINS:

1

Palm Oil Manufacturing

Important to bring all relevant stakeholders into early discussion on how to build up the internet of things through reconfiguring the applications and contents.

Identify critical nodes of stakeholders to augment efficiency, competitiveness and improve productivity.

The ASEAN Economic Community (AEC)

Every stakeholder must share their knowledge and identify key requirements in establishing a connected community and ecosystem for the palm oil BUSINESS ECOSYSTEM & SUPPLY CHAINS.
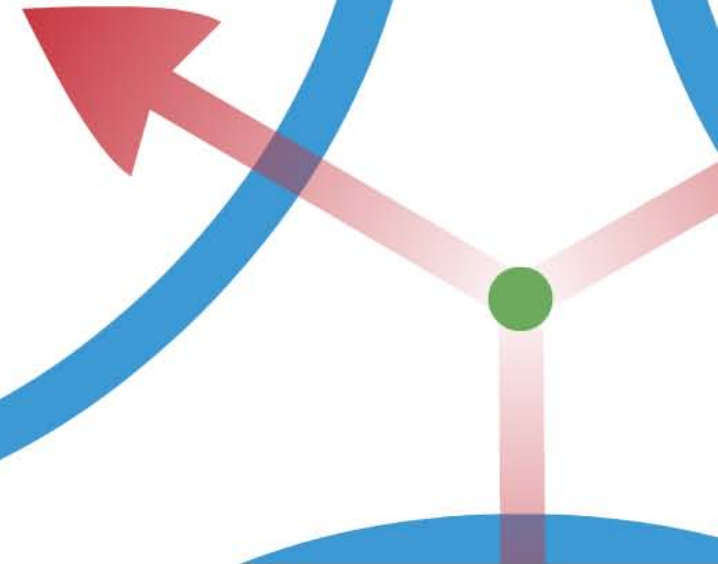
Palm Oil Manufacturing

Plantations
Fresh Fruit bunches are picked every 10-12 days

Important to bring all relevant stakeholders into early discussion on how to build up the internet of things through reconfiguring the applications and contents.

PO is **transported** from the refineries to manufacturing facilities

Manufacturing
Palm oil is now incorporated into hundreds of products from soap to cookies

The PO is refined and separated at the **refineries**

Crude PO is then **shippped** to the refineries

Palm Oil
nufacturing

Important to bring all relevant stakeholders into early discussion on how to build up the internet of things through reconfiguring the applications and contents.

P
h of picking
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pressed to extract oil

is transported
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manufacturing
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Every stakeholder must share their knowledge and identify key requirements in establishing a connected community and ecosystem for the palm oil BUSINESS ECOSYSTEM & SUPPLY CHAINS.

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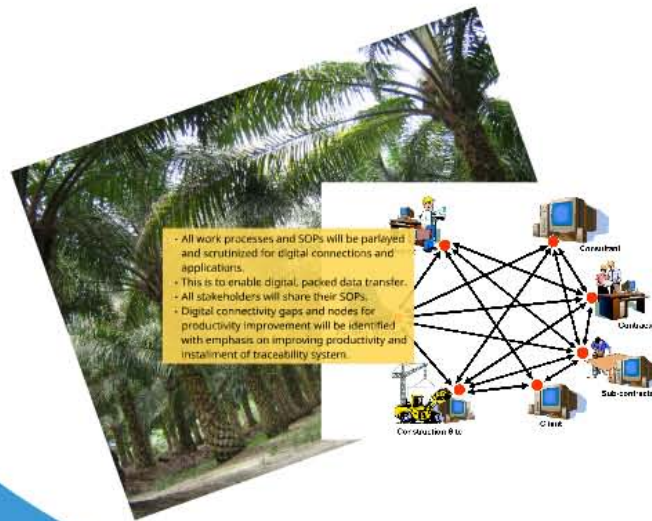
Identify critical nodes of stakeholders to augment efficiency, competitiveness and improve productivity.

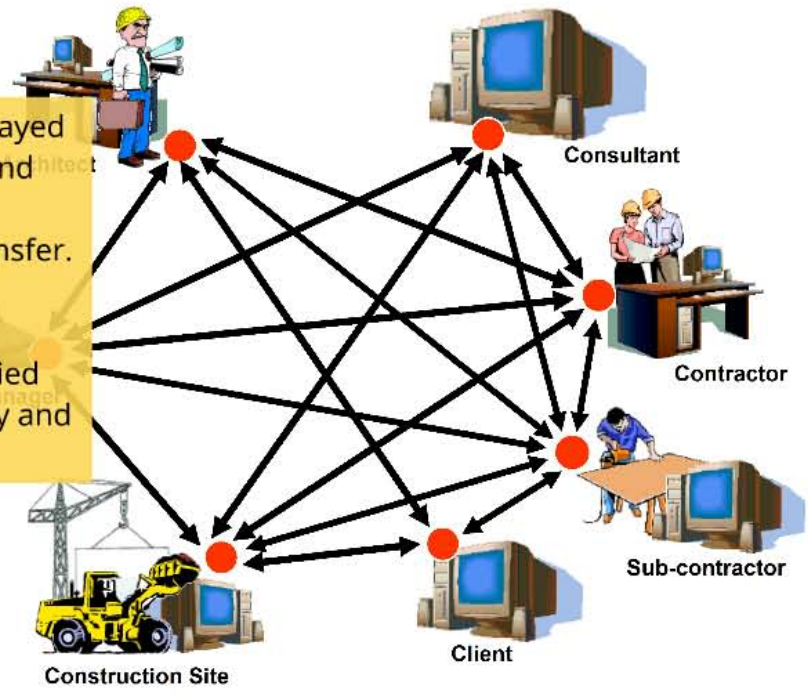# IDENTIFYING GAPS & NODES ON THE PALM OIL SUPPLY CHAINS & INSTAL THE INFRASTRUCTURE FOR THE INTERNET OF THINGS TO FLOURISH FOR THE PALM OIL INDUSTRY:

2

- All work processes and SOPs will be parlayed and scrutinized for digital connections and applications.
- This is to enable digital, packed data transfer.
- All stakeholders will share their SOPs.
- Digital connectivity gaps and nodes for productivity improvement will be identified with emphasis on improving productivity and installment of traceability system.

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3 Testbed Projects:

For the development of flagship applications like phone banking, e-government, digital payment system;
Profile the daily working activity and the expenditure structure.

Some of these examples on expenditure profile are payment for medical insurance and healthcare, contribution to SOCSO/KWSP, renewal of driving license, payment f of utility bills, repatriation or money transfer to home country (Indonesia, Bangladesh, Nepal, etc.), hospital bills, passport renewal, transportation costs, etc.

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Sime Darby

FELDA

PERKESO

PANTAI HOSPITAL Cheras

CHERAS MEDICAL CENTRE SDN. BHD. (227140-P)
1, Jalan 1/96A Taman Cheras Makmur, 56100 Kuala Lumpur.
Tel: 03-91322022 Fax: 03-91320732

INPATIENT BILL (SUMMARY)

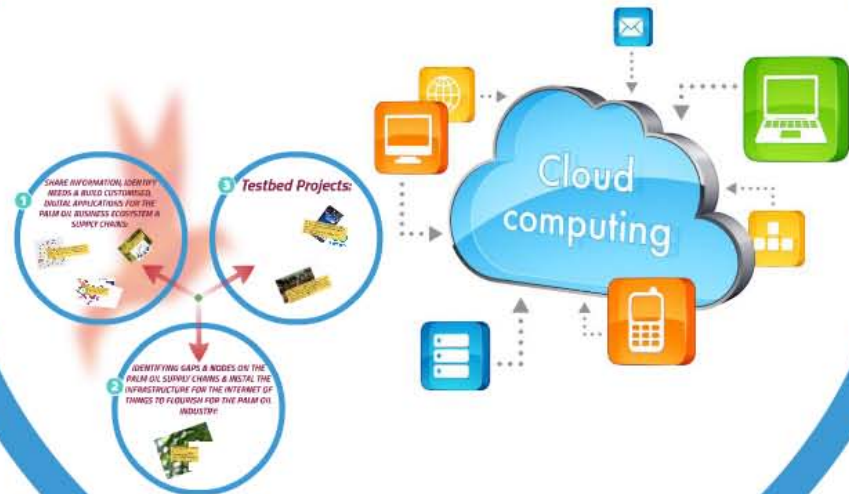|				
Date	: 08/03/2012 11:53	Bill No.	: I120300399	
Debtor Code	: M0159	Page	: 1	
Debtor	: METRONIC ICARES SDN BHD	Credit Term	: 0	Day(s)
Address	: NO.2, JALAN ASTAKA U8/83, SEKSYEN U8, BUKIT JELUTONG SHAH ALAM	Employee No.	: T090556237	

Adm Date/Time   : 05/03/2012 17:10:11
Dis Date/Time   : 08/03/2012 10:21:41
Ward/Rm/Bed/Type: SW/2018/2018B/4
Length of Stay : 3   Day(s)

AMOUNT (RM)	DISCOUNT (RM)	TAX (RM)	TOTAL (RM)
209.70	0.00	12.58	222.31
239.49	0.00	14.36	253.78
180.75	0.00	0.00	180.75
502.00	0.00	0.00	502.00
992.28	0.00	0.00	992.28
268.94	0.00	0.00	268.94
141.00	0.00	0.00	141.00
187.00	0.00	0.00	187.00
27.00	0.00	0.00	27.00
30.00	0.00	0.00	30.00
850.00	0.00	0.00	850.00
60.00	0.00	0.00	60.00
426.00	0.00	0.00	426.00
			4,141.06

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ICT DEVELOPMENT SCENARIOS

SHARE INFORMATION, IDENTIFY
NEEDS & BUILD CUSTOMISED,
DIGITAL APPLICATIONS FOR THE
PALM OIL BUSINESS ECOSYSTEM &
SUPPLY CHAINS:

Testbed Projects:

IDENTIFYING GAPS & NODES ON THE
PALM OIL SUPPLY CHAINS & INSTAL THE
INFRASTRUCTURE FOR THE INTERNET OF
THINGS TO FLOURISH FOR THE PALM OIL
INDUSTRY!

Cloud computing

WHAT ARE THE PRE-REQUISITES &

D ICT DEVELOPMENT SCENARIOS

C WHAT ARE THE PRE-REQUISITES & OPPORTUNITIES TO FOUND & FOSTER ICT INNOVATIONS FOR COMPETITIVENESS OF THE PLANTATION INDUSTRY?

B TARGET AREAS IN ICT INNOVATIONS FOR THE OIL PALM PLANTATION SECTOR

A RATIONALE FOR ICT INNOVATIONS, MILESTONES IN PLANTATION INNOVATIONS & ICT INNOVATIONS IN MALAYSIA

MPOA

OPPORTUNITIES & CHALLENGES
IN ICT DEVELOPMENT
FOR THE PLANTATION INDUSTRY