



UNIVERSITI
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UTP-SC
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ADVANCING PROFESSIONALISM

MPOC/UTP

Palm Oil Educational Outreach Webinar

Tuesday, 25 May 2021

9.00 a.m – 12.45 p.m

Prospects of Plantation Agriculture 4.0

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APPLIED AGRICULTURAL RESOURCES SDN. BHD.

Scope:

- The Importance of Oil Palm
- Main Relevant Challenges of the Oil Palm Industry
- Important Areas of Development Towards Agric. 4.0
- Concluding Remarks

Why is Oil Palm Important

- It is the highest oil-bearing crop in the world, 8 to 10 more productive than Soybean
- The average oil yield can be improved by another 50% to more than 6 t/ha/yr
- It occupies 7% of the world oilseeds area (21 of the 288 mil ha) but is supporting 39% of the oil and fat demands
- It generates more than RM 70 billion of export earning each for Malaysia and Indonesia in 2020

Main Relevant Challenges of the Oil Palm Industry

- Shortage of skilled harvesters (*losing > 3 mil mt. of CPO or > 9 billion Ringgit of revenue each year*).
- Constant threats of Pests (*RB*) & Diseases (*Ganoderma*)
- Slow in introgression of planting materials with desirable traits (*short, drought tolerant, less loose-fruits etc.*)
- New data acquisition techniques are needed to acquire data suited for site-specific practices (*e.g. variable fertiliser inputs*)
- Lack of emphasis to support studies on technologies, mechanization and automation for agriculture

Important Areas of Development Towards Agriculture 4.0

Harvesting of Fruit Bunches

Short palm harvesting with a motorized cutter

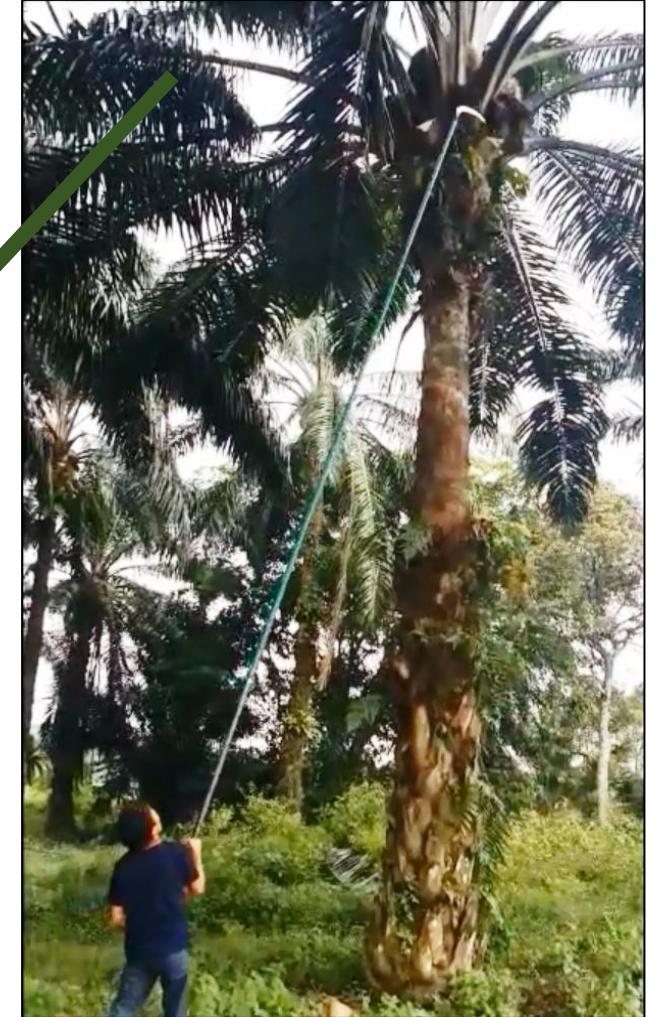


Suitable exoskeleton
or Lift-harness be
useful.



New Equipment Digest

Tall palm harvesting with a light pole



Pest Control – Rhinoceros Beetle (RB)

An adult beetle



Fortnightly spraying of pesticide for 3 consecutive years during the immature period is required.

Damage on 2 year-old-seedlings



An autonomous Spot-spraying Drone



Breeding and Soil Health

Biotechnology

- Marker assisted and Genome-wide Selection for planting materials with superior traits (*e.g. high OB, short, drought tolerant, slim petiole, less loose-fruit etc.*)
- Overcome abnormality in tissue culture
- Study Ganoderma Invasion pathway & Host-pathogen Interaction

Microbiology

- Beneficial microbes (*e.g. to fix N, solubilise nutrients, suppress diseases and promote plant growth etc.*)

Normal Fruit

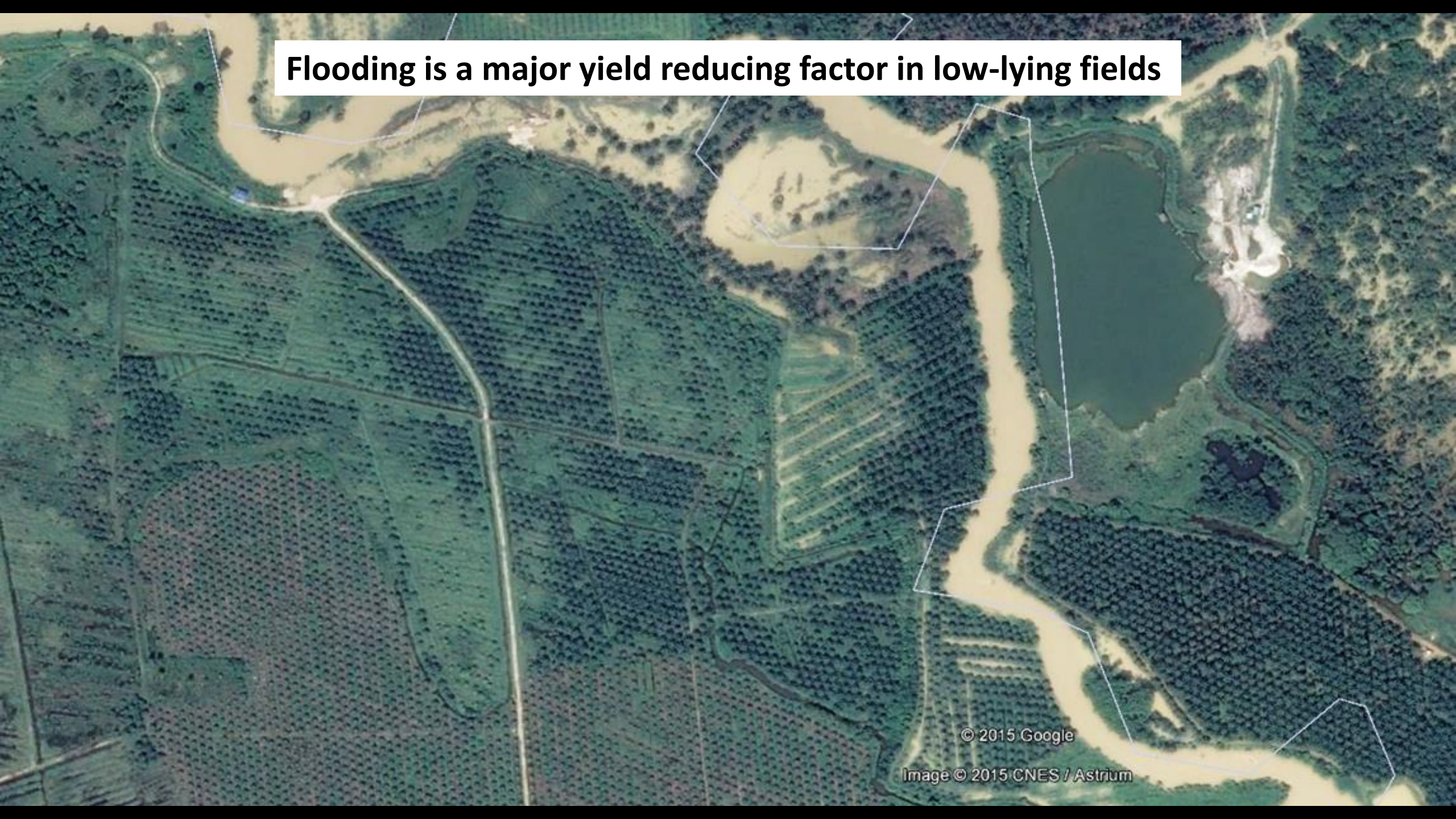


Mantled Fruit



Use of Imaging Drones for Site-specific Practices

Flooding is a major yield reducing factor in low-lying fields



© 2015 Google

Image © 2015 CNES / Astrium

Image-data for Planning & Monitoring

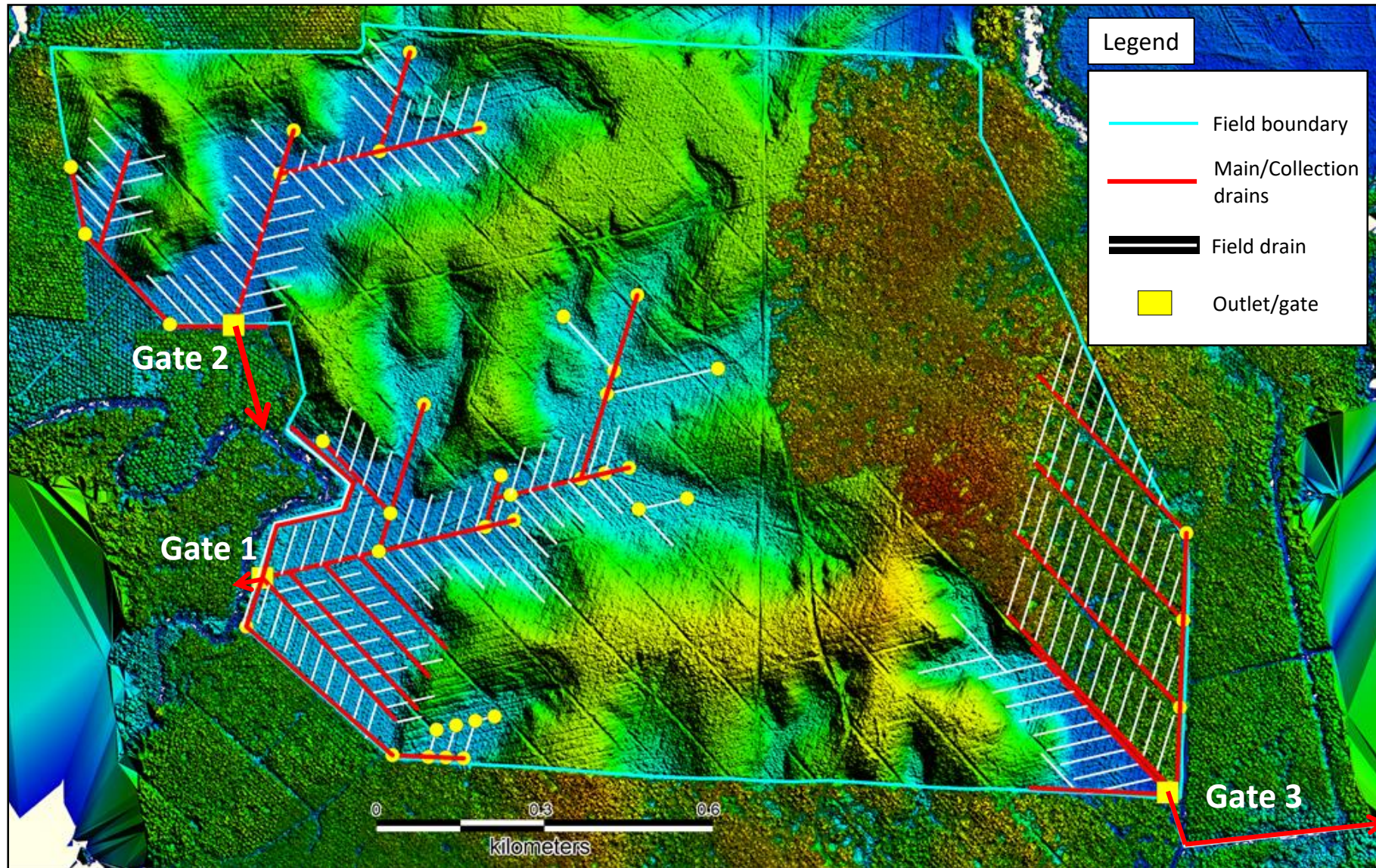


Image-data for Site-specific Practices



Assessment of planting density and planting pattern

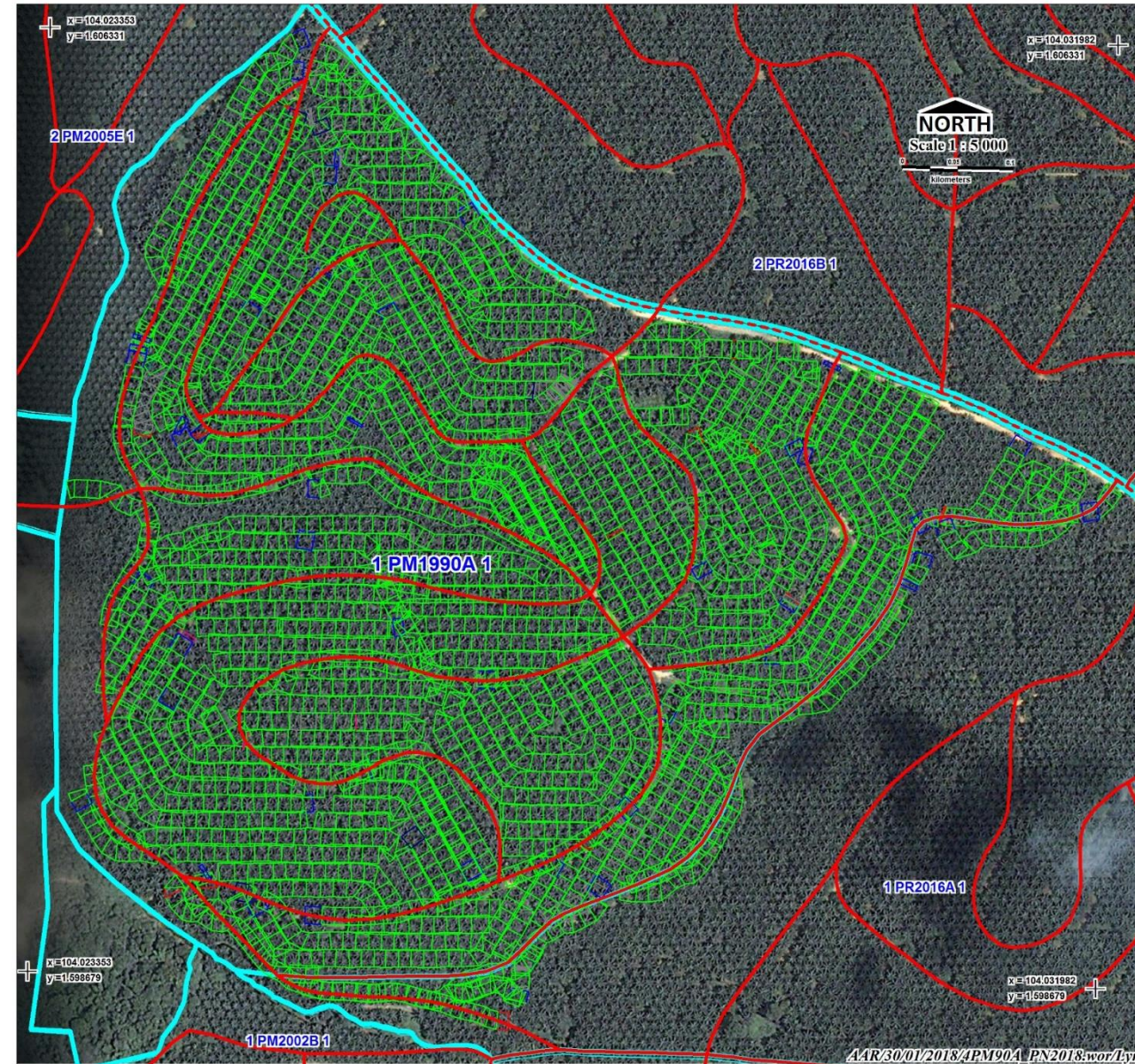
Image-data for Site-specific Practices



Pin-pointing vacancies and palms with poor growth

Variable Rate Fertiliser Spreader

- > 10 times improvement in productivity
- Spread is adjusted automatically with the speed of vehicle
- Rate of application can vary with requirement
- As-applied map is available



Yield Map for Site-specific Practices

FIELD Yield

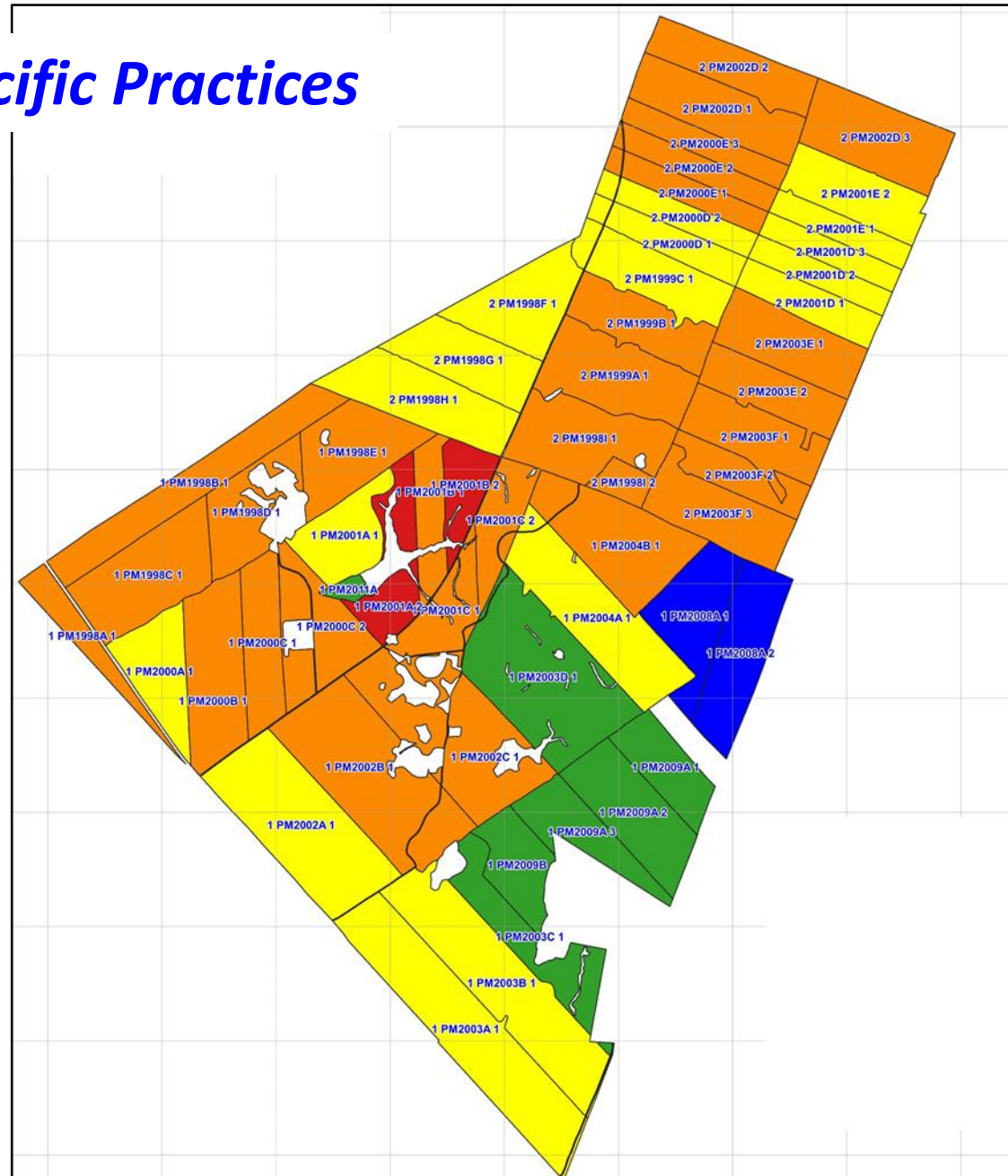
one yield record for ~
50 ha field (7,250
palms)

2. Task Yield

one record for 1.5 to
2 ha (200 to 300
palms)

3. Palm Yield

Yield record for every
single palm



Ton FFB/ha/yr

Legend

Yield Range

0-20

20-25

25-30

30-35

35-40

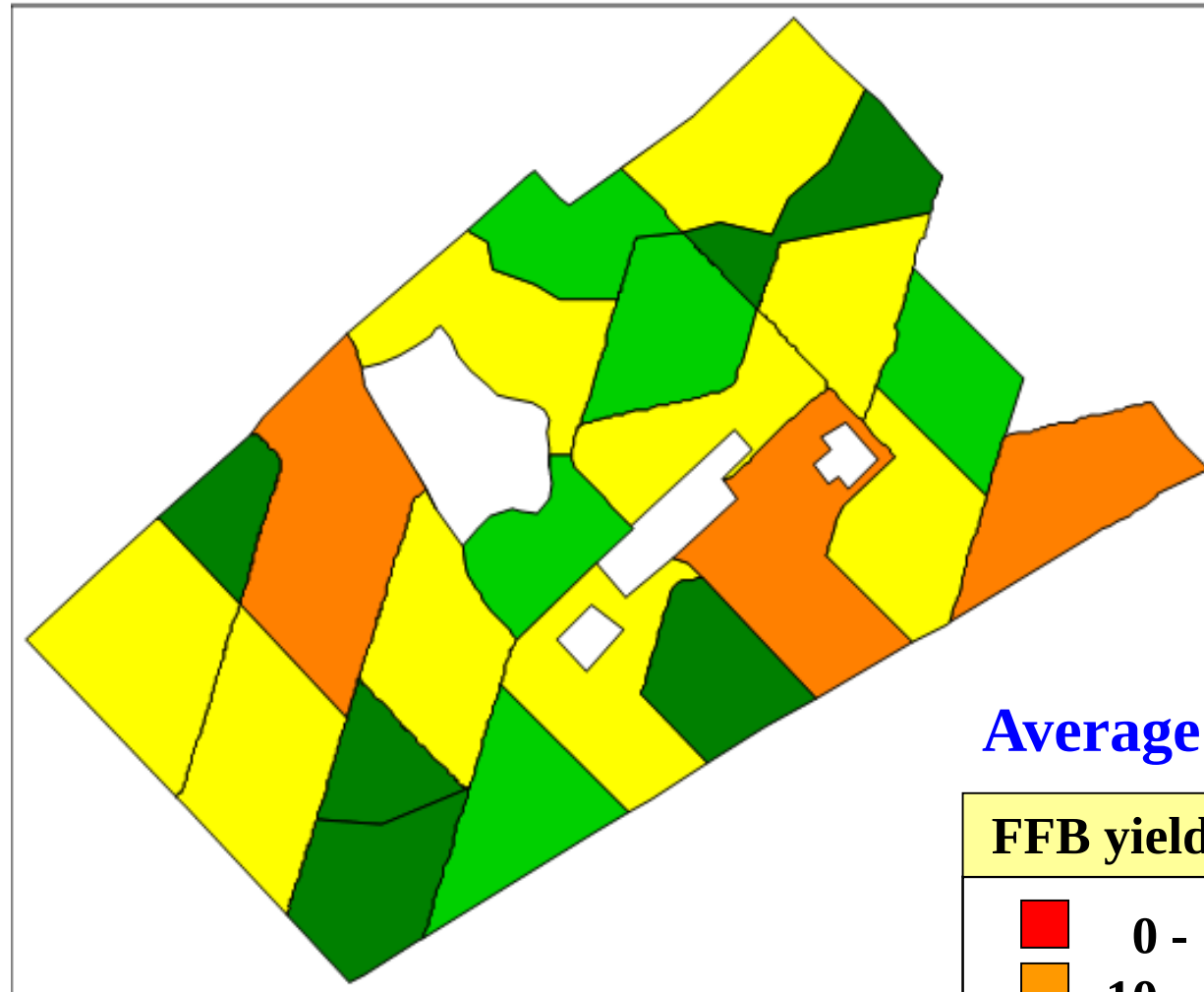
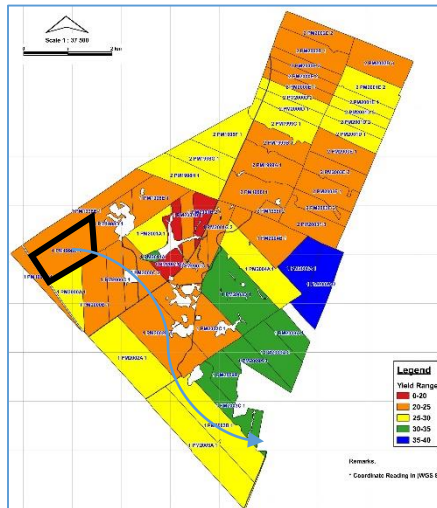
Pin-point poor yielding areas within a FIELD

1. Field Yield

one yield record for ~
50 ha field (7250
palms)

2. TASK Yield

one record for 1.5 to
2 ha (200 to 300
palms)



Yield can varies
with:

- Soil types
- Terrain conditions
- Generalized inputs
- Efficiency in crop recovery

Average yield = 18.6 t/ha

FFB yield by task (ton FFB/ha)

	0 - 10		20 - 25
	10 - 15		25 - 30
	15 - 20		

1. Field Yield

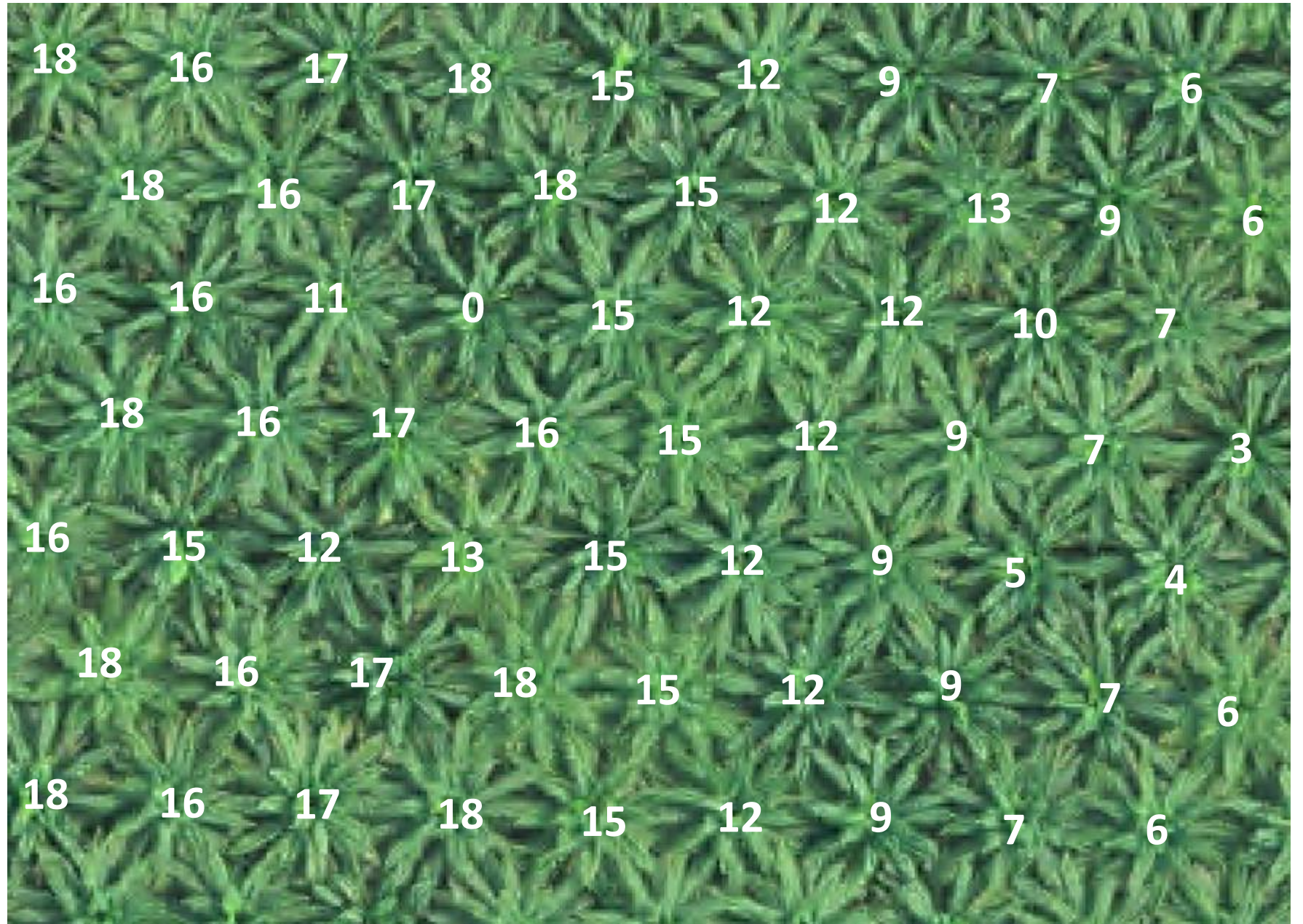
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3. Palm Yield

Yield record for every
single palm



Concluding Remarks

- *Oil palm is the world most productive oil bearing crop*
- *It occupies only 7% of the oilseed area but contributes nearly 40% of the world oil and fat requirement*
- *There are critical challenges we need to overcome and we hope to embrace the IR 4.0's enabling technologies to boost labour productivity, scalability and sustainability*

Concluding Remarks

- *Good agricultural practices can be adopted to optimise yield, maximise profit and minimise impacts on environment and bio-diversity*
- *Opportunities are available for engineers to develop suitable machines, tools and system to reduce burden and enhance productivity of workers, supervisors and managers*
- *Creative and talented individuals are needed to leverage enabling technologies for the next golden revolution of the oil palm industry*



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Thank you