

CROSSROADS
ASIA PACIFIC



KUALA LUMPUR
MALAYSIA
20-22 OCTOBER 2015



Key sustainability issues in the palm oil sector and their influence on fertilizer management in oil palm plantations

Peter Lim Kim Huan
Apical (Malaysia) Sdn. Bhd., Malaysia

Apical

Introduction

- **Palm oil is an important global commodity with several uses (food, non-food and biofuel).**
- **With the emphasis on “No Deforestation”, more oil palm will be planted on degraded and marginal sandy soils in Malaysia and Indonesia.**
- **Fertilization constitutes 60 - 70 % of annual upkeep cost.**
- **Oil palm planting contributes significantly to the socio-economic benefits and poverty alleviation of many developing countries in the tropics.**
- **However it also come with many sustainability challenges.**

Key sustainability issues in the palm oil sector

- **Deforestation of high carbon stock (HCS) areas,**
- **Peatland development,**
- **GreenHouse Gas (GHG) emissions linked to climate change.**

Greenhouse gases (GHGs)

- **GHGs are invisible gases that are held responsible for global warming and on-going climate change.**
- **The main GHGs are CO₂ , CH₄ and N₂O.**
- **CH₄ and N₂O have Global Warming Potentials (GWPs) **23 and 296 times that of CO₂.****

Sustainability Standards

Sustainable requirements are getting more stringent for production, processing and trading of palm oil.

International standards - voluntary

Roundtable Sustainable Palm Oil (RSPO) – 8 Principles and 43 Criteria.

International Sustainability Carbon Certification (ISCC) – 6 Principles and 45 Criteria.

National standard

Indonesian Sustainable Palm Oil (ISPO) - mandatory

Company Standard / Manifesto

Sustainable Palm Oil Manifesto (SPOM) collectively signed by Sime Darby Plantations, KLK, IOI, Cargill, Musim Mas, Asian Agri and Apical, on 2nd April 2014.

SPOM uses the Principles and Criteria of RSPO as the foundation, as it is most developed and globally recognised.

Sustainable Palm Oil Manifesto (SPOM)

KEY COMMITMENTS:

- **No deforestation of high conservation value (HCV) and high carbon stock (HCS) areas,**
- **No new development on peat. Protection of existing developed peat areas by Best Management Practices.**
- **Drive positive socio-economic impacts for people and local communities.**

The Global Goals for Sustainable Development

During the United Nations General Assembly on 25 September 2015, 193 world leaders committed to 17 Global Goals.

The 4 goals with implication on fertilizer management are :

Goal 2 : Achieve food security, improved nutrition and promote sustainable agriculture.

Goal 6 : Clean water and minimize water pollution.

Goal 13 : Take urgent action to combat climate change.

Goal 14 : Reduce marine pollution from land-based activities including from fertilizers/nutrients.

Evidence of global warming and climate change

- Melting of Polar Ice Cap.
- Unpredictable weather pattern.





Carbon Emission from Peat

Asumption

- Peat depth - 3m
- Density - 0.1 t/m³
- Total biomass/ha - 3 x 10,000 x 0.1 = 3000 t/ha
- Carbon content - 40 %
- **Carbon stock** = 3000 x 40/100 = **1200 t C/ha.**
- **If we drain peat for planting oil palm,**
the CO₂ that will be emitted into the atmosphere is
44/12 x 1200= 4400 tCO₂/ha.



RSPO Principles, Criteria and Indicators related to fertilizer management

- **Criteria 4.2** : Best practices to maintain/improve soil fertility to level that ensure optimal and sustained yield.
- **Indicator 4.2.3** - Efficient fertilizer application based on periodic foliar & soil sampling and analysis to monitor changes in soil nutrient status.
- **Indicator 4.2.4** – Optimize nutrient recycling esp.
- Mulching with empty fruit bunches (EFB),
- Land application of palm oil mill effluent (POME).
Advocate land application after methane (CH₄) capture using anaerobic digestion technology.





Management of Soil Organic Matter





RSPO Criteria 4.4

- **RSPO Criteria 4.4 – Practices to maintain the quality of surface and ground water by avoiding contamination from applied chemicals and fertilizers.**

To develop cost-effective controlled release fertilizers with more durable coating.

RSPO Criteria 5.6

- Plans to reduce pollution and GHG emissions in all activities eg. fertilization are developed, implemented and monitored.

- Reduce N₂O emission from application of nitrogenous fertilizers estimated at 0.01 Kg N₂O per Kg N/ha/year.

Development of urease and nitrification inhibitors that have longer active period in soils.

- Reduce CO₂ emission from transportation of fertilizers

- Sea transport - 0.0178 Kg CO₂/km/ t

- Road transport - 0.312 KgCO₂/km/t

Need to use more concentrated fertilizers that are produced closer to the sites of application.

Labour constraint in fertilizer application

- Labour shortage in efficient fertilizer application esp. on hilly terrains and peat areas (soft ground condition) contributes to uneven and often poor timing of fertilizer applications in plantations.
- Mechanization and other innovative methods of fertilizer application need further research.
- Good field supervision is vital to ensure even and timely fertilizer applications in oil palm plantations.

Heavy metals

- With declining availability of good quality phosphates, heavy metals esp. Cd contamination may emerge as a food safety issue.
- More research will be required to study whether Cd can find its way into palm oil and palm kernel through application of low grade phosphate fertilizer.

Fertilizer Quality Assurance

- Ensuring maximum fertilizer-use efficiency is important as fertilizers is a major cost and a key driver of high yield in oil palm cultivation.
- Quality assurance in term of meeting fertilizer specifications, consistency, packing materials and time of delivery, are vital.
- To look into ways of preventing fertilizer adulteration along the supply chain.

Conclusions

- **Adequate and balanced fertilization is vital to ensure long-term sustainability in oil palm cultivation.**
- **Good field supervision esp. in water management is a prerequisite to efficient fertilization and sustainable oil palm yield.**
- **Quality assurance in term of fertilizer specifications, consistency, time of delivery and steps to avoid adulteration, are vital for ensuring efficient fertilizer use.**
- **More applied field research is needed to optimize methods to ensure even and timely fertilizer application and to enhance the fertility of land planted with oil palm.**

Apical

THANK YOU