

Indonesian Palm Oil Association (IPOA)
Gabungan Pengusaha Kelapa Sawit Indonesia (GAPKI)

Subject: Open Call for Data on Standard Yield Curve for Oil Palm

Key Points Summary

- **The European Commission is attempting to establish what it refers to as a ‘dynamic yield baseline’ for oil palm plantations.**
- **Variability of yields is compounded by growing conditions, as well as differing production models, whether from smallholders, larger plantation firms or nucleus-plasma models.**
- **Variability is not only in the magnitude of the yield curve, but also in the shape of the curve.**
- **Consequently, the observed baseline in palm oil producing countries varies significantly and it is not particularly useful to generalise regarding yield curves.**

Background

The European Commission is attempting to establish what it refers to as a ‘dynamic yield baseline’ for oil palm plantations.

The baseline is the expected yield over time for specific oil palm plantations under static conditions over time, with the only variable being the ageing of the oil palm trees.

The Commission, we assume, is well aware that there is a body of literature on yield gaps, i.e. improving the yield of perennial crops between the observed yield and the potential yield.

The potential yield is established via modelling a number of variables. Generally, these main variables are as for all other crops: light, water and nutrients.

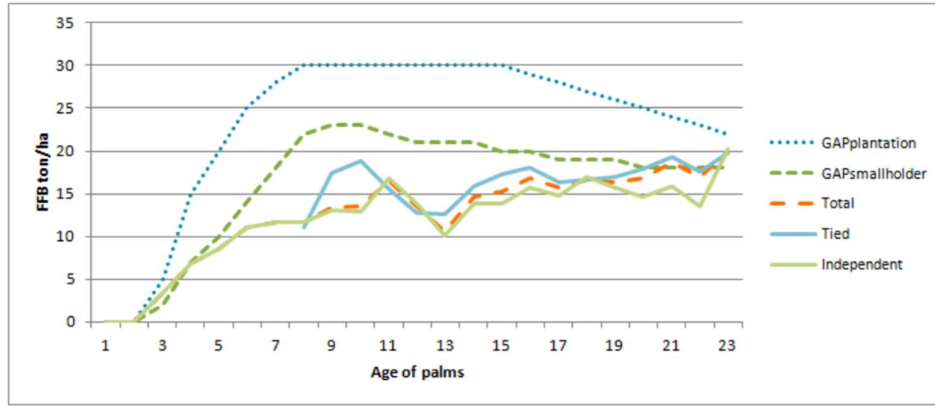
As a perennial crop and, variation in microclimatic events, resources availability and occurrences of abiotic and biotic stresses during a given period will result in fluctuations in production afterwards.

This variability of yields is further compounded by the differing production models, whether from smallholders, larger plantation firms or nucleus-plasma models.

Consequently, the observed baseline in palm oil producing countries varies significantly and it is not particularly useful to generalise regarding yield curves.

Smallholders

For example, a most comprehensive survey of smallholder farmers undertaken by the International Finance Corporation demonstrated significant differences between smallholders and other production models.

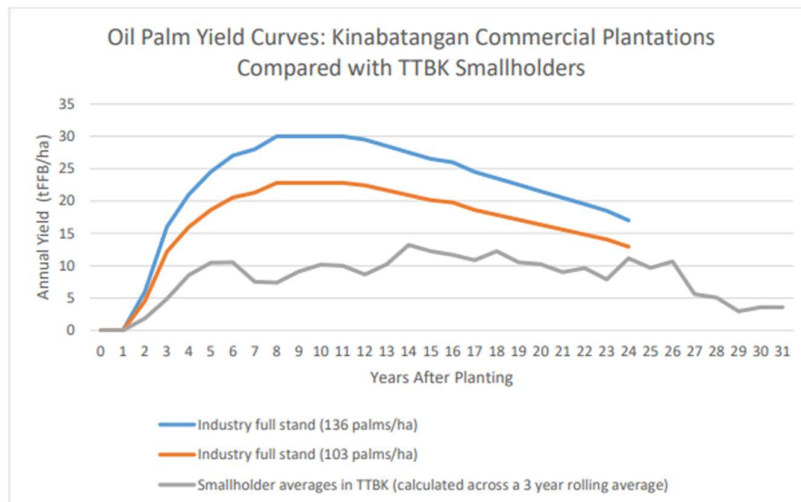


Source:

https://www.rsपो.org/file/Diagnostic_Study_on_Indonesian_Palm_Oil_Smallholders.pdf

We are aware that the Commission is more interested in the ‘shape’ of the yield curve rather than the magnitude of the yield curve. What is observable in the data is that peak productivity is not achieved for independent smallholders until considerably later after planting, with the broader trendline peaking and flattening considerably later than for plantation-based models.

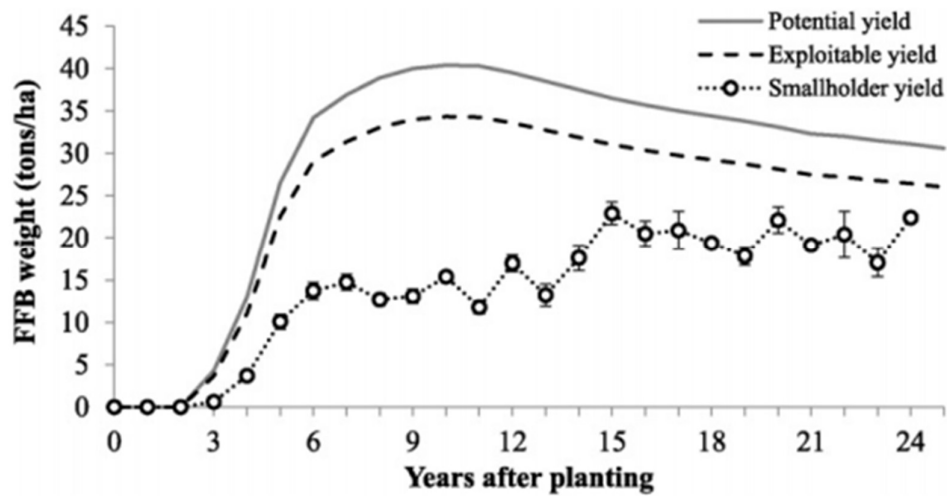
The data presented in the IFC study is similar to that presented in research assessing the actual yields of smallholders in Sabah, Malaysia.¹



Source: See footnote

¹ Kenneth Wilson, Nicola Karen Abram, Philip Chin, Cynthia Ong, Elisna Latik, Hilary Herie Jitlon, Maslianah Ramlan, Norsuhazmil Bin Amat Nor, Chris Isham Kinsui, Mohd Dzulfikar Bin Rosli, Joannes Wasai, Megavani Kumar (2018) Smallholder Readiness for Roundtable on Sustainable Palm Oil (RSPO) Jurisdictional Certification of Palm Oil by 2025: results from field studies in Sabah’s Telupid, Tongod, Beluran & Kinabatangan Districts. Forever Sabah. Kota Kinabalu, Sabah, Malaysia. At https://10e9edad-d02a-46ba-859f-75c88cba5b21.usfiles.com/ugd/55b1eb_afe08160c0de47f7b2a5496b86cb79c4.pdf?index=true

It is also similar to work undertaken by the University of Goettingen on smallholder yields in eastern Sumatra over 363 smallholder plots, below.



Source: <https://www.sciencedirect.com/science/article/abs/pii/S0308521X16300920>

Variability in the ‘shape’ of the yield curve has been previously well noted in audited work undertaken by the World Bank in Indonesia. Although the smallholder plantations all reached peak productivity at 11 years, there was considerable variation between yield losses following the peak, varying between 20 per cent and 50 per cent.²

Geographical variability

Similarly, there is considerable variation in terms of yield regarding geography. Actual yield differs within Southeast Asia.

In Malaysia, for example, actual average yield in 2017 ranged between 14.48 t ha⁻¹ and 20.63 t ha⁻¹. In 2017 in Indonesia it ranged between 8.49 t ha⁻¹ and 15.40 t ha⁻¹.³ These figures were based on recorded yields from both plantation estates and smallholders, with considerable variation recorded due to the number of smallholders across varying locales.

Related to this, the figures indicate the unreliability of incorporating potential yields into any baseline analysis.

² <https://documents1.worldbank.org/curated/en/497141468915000150/pdf/11076-PPAR-PUBLIC.pdf>

³ http://wtlab.iis.u-tokyo.ac.jp/wataru/publication/pdf/oil_palm_suitability.pdf

More broadly, actual yield differs further globally, as indicated by the data below:

Country	Area harvested ¹ (Mha)	Annual production (Mt)		Yield (t ha ⁻¹ yr ⁻¹)		OER ² (%)	Data source
		FFB	CPO	FFB	CPO ³		
Indonesia	7.1	120	26.9	17	3.8	22.4	FAO, unofficial figure
	8.1		30.5		3.8		USDA
Malaysia	4.6	95.7	19.2	21	4.2	20.0	FAO, unofficial figure
	4.5		20.2		4.5		USDA
Nigeria	3.0	8.0	1.0	2.7	0.32	12.0	FAO, estimate
	2.5		1.0		0.39		USDA
Thailand	0.63	12.8	2.0	20.5	3.1	15.1	FAO, official data
	0.66		2.0		3.0		USDA
Colombia	0.45	5	1.0	20	3.5	17.5	FAO, official data
	0.34		1.0		3.1		USDA
Ghana	0.36	2.1	0.12	5.8	0.30	5.2	FAO, estimate
	0.37		0.49		1.3		USDA
Guinea	0.31	0.8	0.05	2.7	0.20	7.4	FAO, estimate
	0.31		0.05		0.16		USDA
DRC (Congo)	0.28	1.8	0.30	6.6	1.1	16.7	FAO estimate
	0.18		0.22		1.2		USDA
Côte d'Ivoire	0.27	1.7	0.42	6.5	1.5	23.1	FAO, unofficial figure
	0.27		0.42		1.5		USDA
Ecuador	0.22	2.3	0.33	10.6	1.5	14.2	FAO, official data
	0.22		0.57		2.6		USDA
Papua New Guinea	0.15	2.1	0.50	14	3.3	23.6	FAO, unofficial figure
	0.15		0.50		3.4		USDA
Cameroon	0.14	2.5	0.23	18.2	1.7	9.3	FAO, unofficial figure
	0.13		0.29		2.2		USDA
Honduras	0.13	2	0.43	16	3.4	21.3	FAO, unofficial figure
	0.13		0.46		3.7		USDA
Brazil	0.11	1.3	0.34	11.5	3.1	27.0	FAO, official data
	0.12		0.34		2.8		USDA
Guatemala	0.07	1.5	0.40	22.8	6.2	27.2	FAO, unofficial figure
	0.10		0.43		4.3		USDA
Costa Rica	0.07	1.3	0.30	17.5	4.0	22.9	FAO, estimate
	0.06		0.21		3.5		USDA
World	18.1	266.5	54.4	14.8	3.0	20.3	FAO, aggregate
	18.6		59.4		3.2		USDA

Source:

https://www.researchgate.net/publication/312448007_Yield_gaps_in_oil_palm_A_quantitative_review_of_contributing_factors

It should be noted Nigeria has the lowest average yield of all nations, and also has the highest percentage of smallholder producers.

Conclusion

In updating its ‘yield curve’ the European Commission and its consultants should be acutely aware that a ‘one size fits all’ approach to perennial crops is not appropriate given both production systems as well as geographies.

Although data is limited with regards to observed actual yields, there is enough data to dispense with the fiction that a single curve – for any production system – is appropriate.