Optimum Oil Palm (Elaeis guineensis Jacq.) Planting Density for West Africa

Context: Oil palm in Nigeria, West-Africa and the world
- Most productive oil crop with yield potentials of 4-8 tons of oil per hectare
- 2.1 million hectares worldwide (average yield 3.8t/ha) and 4.1 million in West-Africa (average yield 0.7t/ha) (FAOSTAT, 2016)
- Oil palms are planted for 25-30 years and foliage increases up to 12 years after planting.
- Optimum plant density evolves during the life cycle but can not be changed easily after planting.
- Planting density is essential to maximize yield over the planting cycle.
- For phytosanitary reasons it is preferable to replant at the same density.
- Planting material, ecology and management determine the optimum planting density.
- Need to determine optimal planting density under different scenarios.
- This study presents the results from 12 years of trial in Nigeria with the effects of planting density on growth and production so far as well as extrapolation to the full life cycle.

Material and methods
- Field trial planted in May 2005 following a simple Fisher block design with 6 treatments, 4 replicates and unit plots of 20 palms surrounded by double borders.
- Trial planted at Ologbo Estate of Presco plc (Fig.1).
- Planting material, soil type and climate are representative of the west-African oil palm regions.
- Statistical analysis by ANOVA and comparison by Tukey test for Honest Significant Difference at 5%.

Results

Conclusions
- Higher planting density gives higher yields in the first years which later drop due to excessive interpalm competition.
- Too low a density will not achieve the best yield potential thus underutilizing the land and natural resources.
- 12 years after planting the intermediate densities have higher cumulative yields than the highest densities.
- This trend is forecast to continue during the second half of the planting cycle and extrapolations place the optimum density between 143 and 160 palms per hectare for a 25 year cycle.
- Competition for resources between palms is evident through the effect on production.
- More collaborative research in ongoing to further evaluate the different drivers of resource competition so that planting density recommendations can be better adapted to the characteristics of the planting material and environment.

References
FAOSTAT, 2016