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Impact of Prolonged Dry Period on Oil Palm Yield and Mill Extraction Ratio: A Case Study

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Based on current trends in climate change, El Nino and La Nina events are likely to become more frequent, with the former having a more significant negative impact on oil palm growth and production. Since 1980, ten El Nino events or prolonged dry periods have been recorded in Indonesia, of which three and five events have been categorised as severe and moderate, respectively. The most severe of the three El Nino events occurred in 1997, followed by a more recent one in 2015. This paper is a case study which examines the impact of the 2015 El Nino event on the fresh fruit bunch (FFB) production of two generations of oil palms planted in two neighbouring estates and oil extraction ratios (OER) of a mill receiving crop from the latter two estates.

Four consecutive months of low rainfall in 2015, resulted in annual water deficits of 280 - 313 mm, which was followed by a decline in FFB production over two distinct periods i.e. 4 to 12 months and 24 to 30 months after the El Nino event, respectively. In both cases, a sharp decline in the number of harvestable bunches was the main contributing factor, likely to be due to an increase in inflorescence abortion and lowering of inflorescence sex-ratio. Average bunch weight (ABW) generally remained unaffected.

The initial impact of the drought was more severe on the younger palms, but due to a better recovery rate, the overall yield decline (23%) over a 12-month period in the following year, was significantly lower than in older palms (30%). Analysis of 14 years' yield and climatic data showed that apart from rainfall, other abiotic and biotic factors such as fruiting activity may also be contributing to the 3-year production cycles (peak crop, decline, recovery, peak crop) exhibited by both estates. As such, it was difficult to accurately apportion yield decline primarily due to water deficit from the other influencing factors.

The study also indicated a negative effect of drought on mill OER. Extended dry periods in 2015 (4 months) and 2019 (4 months) were consistently correlated with periods of declining OER, 7 to 14 months later. Like FFB, the prolonged decline could also be attributed to multiple factors.

Keywords: El Nino, oil palm, OER, rainfall, water deficit.

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