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Impact of Topography on Oil Palm Yields in Marginal Conditions in Ghana

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Abstract

Typically, Ghanaian oil palm plantations rest on an undulating topography. There is little information on how topography impacts on oil palm yields and growth. A study was conducted to evaluate this relationship in a commercial oil palm plantation located in the Kwaebibirem District of the Eastern Region of Ghana. The conditions under which oil palm is cultivated can be considered marginal because of inadequate mean annual rainfall ($<$ 2000 mm) coupled with an uneven distribution. Also there is about 5 months of dry season coinciding with sometimes severe harmattan which can last for about 3 months. Soils here are generally not fertile, especially in replanted areas. The soil-relief and pests can also have great impact on the yields of oil palm.

A plot with two different topographic positions – hillside and valley bottom – was selected for this trial. Three replicates were sited at each topographic position, making 6 replicates altogether. Four muriate of potash fertiliser treatments namely, 0.25 kg, 1.5 kg, 2.75 kg and 4 kg were applied per palm per year. Yields were recorded every two weeks for 6 years (from the 4^{th} to the 9^{th} year after planting). Foliar analysis was also conducted annually to monitor the leaf mineral nutrient levels. Results showed that average yield for the valley bottom/lowland was double that of the yield obtained from the hillside/upland. Hence, productivity of oil palm production can be greatly improved when cultivation is concentrated in the valley bottoms in these marginal areas. It is therefore proposed that a better land use, based on the maximisation of both the productivity of oil palm and sustainability of the whole cropping system be adopted. This land use proposal recommends a narrow band of natural vegetation around streams/rivers and creation of buffer zones to serve as catchment areas to prevent erosion and siltation. The slope will be reserved for rubber cultivation with biodiversity plots made of mostly local species occupying the summit of the hill.

Keywords: Hillside, topographic position, oil palm, valley bottom, yield

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