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Analysis of Dynamic Agroforestry Systems and Cocoa Plant Health in in Western Ghana

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Abstract

Agroforestry can help mitigate the numerous negative ecological effects caused by cocoa production with full-sun monocultures providing at the same time the diversification of livelihoods through the selling of by-products. Because the high vulnerability of young cocoa trees represents one of the major constraint for farmers, this study in Western Ghana compared cocoa health and field management quality in monoculture and in agroforestry systems during the field establishment phase. Cocoa mortality rate, vigour, growth rate and field management quality were assessed on 20 Dynamic Agroforestry (DAF) and on 9 monoculture fields aged one, two or three years. The results showed that cocoa mortality rate is lower and the growth rate is higher in DAF than in monocultures. Cocoa vigour and field management quality do not particularly differ between the two cultivation systems. However, management quality strongly influences the three plant health parameters. With better field management, cocoa plant health is higher. Many factors not necessarily dependent on cultivation system were found to influence cocoa health such as field planting scheme and accuracy during weeding practices. On the other hand, shade percentage on the field was not a significant factor for higher cocoa health in DAFS. The findings highlighted the potential of DAFS and of good management practices to improve cocoa health during the vulnerable field establishment phase. For this reason, it is important to encourage farmers to diversify their livelihood with DAFS but also to sensitise farmers to improve the management quality to enhance cocoa health during the field establishment phase.

Keywords: Cocoa production, dynamic agroforestry, field establishment of cocoa, field management, plant health