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Off-farm work, technical efficiency, and household income: reconciling productivity and sustainability on Ghana’s cocoa farms

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Abstract

The Ghanaian cocoa sector faces critical challenges that have contributed to a steady decline in national cocoa output, reducing export revenues and adversely affecting farmers whose livelihoods depend entirely on cocoa production. In response, many farmers engage in off-farm income-generating activities as a coping strategy. However, this raises concerns about its potential impact on farm productivity. This study examined the effect of off-farm work participation on cocoa farmers’ technical efficiency and household income. The Stochastic Frontier Analysis was used to estimate technical efficiency and its determinants, and Heckman’s two-step model used to address potential selection bias and robustness test. SFA results indicated that farm size, capital, and fertiliser positively influenced cocoa yield, while farming experience, off-farm work, FBO membership, extension access, and credit reduced inefficiency. In contrast, disaster occurrence and farm age increased inefficiency. The mean technical efficiency score was 0.824, indicating farmers produced 17.6 % below the frontier. Farmers who combined farm and off-farm work recorded a higher efficiency score (0.843) than those who relied solely on farming (0.723), reflecting a 12 % efficiency gap. In Heckman’s model (selection equation-probit), family size, experience, and farm disaster increase the likelihood of off-farm work participation, while credit access and the farmer’s age reduce it. The outcome equation revealed that predicted off-farm work participation, credit access, and off-farm income significantly improve efficiency, while disaster and farm size reduce it. Averagely, 38.06 % of total household income emerged from farm income sources, while 61.94 % from engagement in off-farm work. In conclusion, while off-farm work enhances efficiency and household income, overreliance on it may undermine cocoa sector recovery. A key recommendation is for the Government of Ghana and COCOBOD to revise farmgate prices to reflect rising production costs and ensure fair compensation for farmers. An improved pricing policy would enhance farmers’ income security, reduce their dependence on off-farm activities, and encourage reinvestment in cocoa production. This, in turn, could boost national output, improve farm household welfare, and help Ghana maintain its position as the world’s second-largest cocoa producer.

Keywords: Cocoa, Heckman’s Two-Step Model, Off-farm Work, Stochastic Frontier Analysis, Technical Efficiency