**DEPARTMENT OF AGRICULTURAL ECONOMICS AND AGRIBUSINESS**

**SCHOOL OF AGRICULTURE**

**UNIVERSITY OF GHANA**

**LEGON**

**PHD ORAL EXAMINATION**

**CANDIDATE: NANA ANIMA MARY AKROFI**

**PROGRAMME: PHD AGRIBUSINESS**

**DATE: WEDNESDAY, AUGUST 20, 2025**

**TIME: 2:00PM**

**THESIS TITLE: CLIMATE CHANGE PERCEPTIONS, SEASONALITY IN COCOA OUTPUT AND THEIR EFFECTS ON FOOD SECURITY AMONG FARMERS IN WESTERN AND ASHANTI REGIONS OF GHANA**

**ABSTRACT**

To enhance policy towards addressing the challenges that climate change poses on seasonality of cocoa outputs and farmer income, it is important to have knowledge of cocoa farmers perception of climate change on their cocoa yields and food security, their perceptions on potential climatesmart agricultural practices that enhances adaptation to climate change, their seasonal cocoa production and output that smoothens their income and food security in enhancing cocoa farm productivity and sustainability. Cocoa production in Ghana is marked by seasonality, conditioned by the rainfall pattern with the main harvest (peak) season occurring from October to February, following the major rainy season, and the lighter mid-crop (minor) harvest taking place from June to August during the rainy season. Climate change is an element impacting seasonality in cocoa production and output. However, there is scarcity of information and empirical evidence on their linkages. Rainfall has a greater impact on the yield of cocoa and other tree crops than any other climatic factor. This study used cross-sectional baseline and panel data across 15 communities in three cocoa districts: Ellembelle and Wassa Amenfi Central in the Western Region and Afigya Kwabre North in the Ashanti Region for the analyses. The study used responses from 402 cocoa farmers from a cross-sectional baseline survey data (July 2022), and monthly panel data responses from 150 farmers over two (2) years. The monthly panel data covered the period August 2022 to July 2024 for the 2022/23 and the 2023/2024 cocoa cropping years. A combination of purposive and random sampling approaches was used for the study. The study describes and analyzes farmers’ perceptions of climate change variability and its effects on cocoa yields. Descriptive statistics such as frequencies, percentages, means and graphs were used to describe socioeconomic characteristics, institutional, location, climate change perceptions, Climate-Smart Agricultural (CSA) practices, among others, from the baseline data. A regression model was used to analyze the effects of climate change variability on cocoa yields. The Multivariate Probit (MVP) model was used to analyze the perception of cocoa farmers CSA practices and factors influencing recommended practices for improved cocoa yields and farm income. Panel regressions using the fixed effect regression model was employed to estimate seasonality in cocoa output effects on the income of the cocoa farmers; whilst the random effect multinomial logistic regression was used to estimate seasonality in cocoa output on the seasonal households (women of reproductive age 1549 years) food security indicators; and of seasonal cocoa income effects on food security status of the cocoa farmers. The Women Dietary Diversity Score (WDDS) and the Household Food Insecurity Access Scale (HFIAS) served as proxies for individual (women) and household food security. In general, the findings of the study suggest the perception of long-term declining changes in rainfall negatively influenced cocoa yields. Factors that influenced recommended CSA practices for improved yields are farmer education, marital status and where the farmer resides (location: depicting site specific differences). Diversifying into non-cocoa farm income significantly increases the overall cocoa farm income. Women exhibit greater dietary diversity; thus, nutrition improves as women in the households consume from more food groups during the major cocoa season than in the minor season. Seasonality in cocoa production poses challenges to farmers; being food-secured plays a crucial role in mitigating its negative effects. Food-secured cocoa farmers tend to have higher per-capita income and off-farm income, highlighting the importance of food security in improving the livelihoods of cocoa farmers. However, household food security is impacted negatively throughout the cocoa season (major and minor season periods). The study suggests innovative irrigation schemes to smoothen the seasonal cocoa production to help improve cocoa yields. Additionally, the Cocoa Health and Extension Division of COCOBOD should intensify their efforts in providing farmers with technical training on agronomic practices. Lastly, stakeholders in the cocoa space should strengthen the adoption of agronomic practices and incentivize cocoa farmers with income generating activities to enhance cocoa productivity throughout the year to smoothen their food security needs.

**ALL ARE CORDIALLY INVITED**