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How is Climate Change Related with Food Security at Sekyeredumase Municipality of Ghana

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Abstract

Increase in atmospheric temperature coupled with low rainfall will reduce productivity of crops, and these would effects food security. Ecosystems are likely to be pushed increasingly into alternate states with the possible breakdown of traditional species relationships as applied to food crops. Not surprisingly, agriculture is deemed to be an economic activity that is expected to be vulnerable to climate variability and change. For this study, average annual atmospheric temperature and rainfall were selected as climatic parameter, crop yield for seven (7) major food crops were selected as crop yield (food production) parameter. A well leading agricultural cultivating area such as Ejura-Sekyedumase municipality was selected because it has all the seven (7) major food crops such as Maize, Rice, Plantain, Yam, Cocoyam, Groundnut and Cassava. The results indicated negative skewness for area per hectare of cassava, yam and plantain, and positive skewness for area per hectare of maize, cocoyam, rice and groundnut. The Jarque-Bera normality tests refute the null hypothesis of cassava, maize and cocoyam area per hectare whilst the rest of the crop's area per hectare series hypothesis were accepted. Using linear regression model, the followings were found. For cassava, It was observe that average rainfall and average temperature has significant relationship on cassava yield ($\beta2=4.452$, $\beta3=4.487$, $p<0.05$). Again, there is a significant relationship between area per hectare and cassava yield ($\beta1=0.441$, $p<0.05$). For Maize, they is a statistical significant relationship between average rainfall and average temperature on maize yield ($\beta2=0.3822$, $\beta2=0.4735$, $p<0.05$). We also found that area per hectare has a statistical significant relationship on maize yield ($\beta1=-0.014$, $p<0.05$). For Groundnut, it was observed that area per hectare, average rainfall and average temperature has no significant relationship on groundnut yield ($\beta1=-0.039$, $\beta2=-0.278$, $\beta3=-0.007$, $p>0.05$). For Cocoyam, it was observed that area per hectare, average rainfall and average temperature has no significant relationship on cocoyam yield ($\beta1=-0.008$, $\beta2=0.092$, $\beta3=0.864$, $p>0.05$). For Plantain, it was observe that average rainfall and average temperature has no significant relationship on plantain yield ($\beta2=-0.976$, $\beta3=-0.380$, $p>0.05$). Again, there is a significant relationship between area per hectare and plantain yield ($\beta1=0.003$, $p<0.05$). For Rice, it indicated that average rainfall has a statistical significant relationship on rice yield ($\beta2=1.269$, $p<0.05$). The R2 (0.369) indicates the proportion of variance in crop yield (rice yield) that can be explained by the independent variables. For Yam the result shows that area per hectare, average rainfall and average temperature has no statistical significant relationship on yam yield ($\beta1=2.65$, $\beta2=1.70$, $\beta3=0.0005$, $p<0.05$). This is an indication that area per hectare, average rainfall and average temperature has no statistically significant relationship on crop yield (yam yield).

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Keywords: Maize, Rice, Plantain, Yam, Cocoyam, Groundnut, Cassava, Rainfall, Atmospheric temperature, Climate Change and Crop Yield.

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