Daniel Adae Bonsu

Summative 2 – Pre-Requisite Statistics

The study was conducted on surveys for more than 9500 households in the growing seasons 2002/2003 or 2003/2004 in eleven African countries. The data set specifies farming system characteristics that can help inform about the importance of each system for a country's agricultural production and ability to cope with long term and short-term climate changes or extreme weather events.

The **study design** of this agricultural survey was an **observational/exploratory study**. The population sampling employed a mixed method of **multistage stratified sampling** and this was appropriate as this method divides large populations and makes sampling process more practical.

There was little to no bias in this design as many procedures were implemented with the aim of ensuring reliable and unbiased data production. As an example, during a project meeting of the country teams the sampling technique was defined to minimized sampling errors(cite). Sampling units, activity in each unit as well as specific numbers in each unit were readily defined to eliminate convenience bias.

Two key questions relating to the survey results are as follows:

  i.   How are the farmers household income levels affected by the effects of climate change?
  ii.   What impact does climate change have specifically on crop selection by the farmers?

Based on these two key questions an inferential statistical approach was adopted for question (i).

Null Hypothesis

Farmer household income levels do NOT have a significant relationship with climate conditions

Alternate Hypothesis

Farmer household income levels have a significant relationship with climate conditions

For **testing** we assume a normal distribution proven by the central limit theorem in relation to the large sample size that was used for this study. The linear regression analysis will be the choice for testing, specifically the **Simple Linear Regression**. This was chosen to learn more about the relationship between the independent variable (climate) and the dependent variable (income levels).

The **interpretation** of results is as follows:

If there is a significant relationship and a strong R-square it means we can have a great chance of improving famer's income levels by focusing our efforts on creating ideal climate levels. We will be able to statistically prove how useful the independent variable being climate levels is at predicting the dependent variable being household income levels of farmers. If climate change is not a strong enough predictor of farmer's income levels (i.e if it gives me a R-squared value less than 50%), I will need to explore other variables to help explain household income levels of farmers.