Statistics Summative Assessment by Iretide Oladapo

Question 1

1) Nominal variable. Examples are:
   a) Gender (Dichotomous)
   b) Marital Status
   c) Religion and tribe
2) Numerical Data (Discrete)
   a) Household size
   b) Number and size of separated farm area
3) Continuous variable
   a) Distance to market for selling and buying inputs.

Question 2

The study design for this Agricultural study is an Experimental Design Study. This is because the aim of the study is to determine how farming systems characteristics (explanatory variable) can help inform about the importance of each system for a country's agricultural production and its ability to cope with short- and long-term climate changes or extreme weather events (response variable).

The Population is sampled using a **Stratified sampling** method. In this case, the "Households were chosen randomly **in districts that are representative for key agro-climatic zones and farming systems".** This implies that the Population was divided to identify these particular districts before the samples were randomly selected and measured.

This method is used appropriately because the survey is targeted at Farming households and a Stratified sample segments them into groups based on this shared characteristic.

There are very limited sources of bias because the principles of Experimental design have been applied to this Study. Firstly, all the survey respondents have been subjected to the same controls in this case the questionnaire. The data set collected (9500) is also a large data set hence it is large enough to determine if the effects are true. Finally, the respondents were subjected to randomization.

Question 3

1) Considering that over 50% of respondents are livestock farmers while the others are crop farmers, which of these categories will be more affected by adverse weather and climate change effects?
2) Which risk mitigation strategies can be put in place to manage the vulnerable farming practices identified in this study?

Question 4

To find out which category will likely be more affected by the effects of Climate change and adverse weather effects, I will analyze this data by drawing an inference from the data set using hypothesis tests.

Null Hypothesis: The effects of Climate change and adverse weather effects is the same for livestock and crops

Alternative Hypothesis: The effects of Climate change and adverse weather effects is worse for Crops.

I will use the **Chi-square test** to test this hypothesis. This is because the Live stock Farm system Data and Crop farm system data are both independent and are examples of categorical data. These data were also randomly sampled.
Significance will be determined by using the large sample size of the data set and $p<0.5$

Question 5

a. If a significance effect resulted, this means that the Null Hypothesis will be rejected. This means the effects of Climate change and adverse weather effects is worse for Crops.
b. If the results were not significant, this means that the Null Hypothesis will stand. This will establish that the effects of Climate change and adverse weather effects is the same for livestock and crops.

Question 6

Visualization type:

a. Histogram: Will be used to examine the distribution of the dataset e.g. household size
b. Scatter plots: Will be used to explore the relationship between variables in the data set.
c. Bar plots: Will be used to compare items in the dataset

Question 7

Yes, the research data on fertilizer use, pesticide use and the irrigated area compared to national average values from the FAO and the World Bank is important for research. This research showed the reason for the variance between the FAO and World Bank and the national statistics and also explain how data is skewed.