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Assessment: Statistic Summative Assessment

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1. **Two variable and unique examples of the corresponding variable in the data set.**

   Answers:

   i. **Discrete Variable:** This is a finite variable, that is, the sample data is measurable. Example of this from data sets are;
      - Number of days spent on primary education
      - Number of days spent on secondary education
      - Household size

   ii. **Nominal Variables**: These are mutual exclusive but cannot ordered or measured. They do not provide a quantitative value. Examples in the data sets are;
      - Gender
      - Marital status
      - Tribe of the household

2. The study design identified in the agricultural survey is the **Experimental study design,** and this method is conducted where a set of variables are kept constant while the others sets of variables are being measured as the subject of experiment.

   Multistage sampling method was used to sample the population since the population was divided into clusters (groups), then one or more clusters are chosen randomly and sampled. This method used is appropriate for the application.

   The method used can be bias if the experimental condition is not maintained exactly the same at each time (deviating from established study design). However, carefully selected samples based on certain variables can significantly reduce the biasness.

3. i. Are farmers in South Africa better livestock farmers than the farmers in Ghana?

   ii. Has climate change adversely increased pressure on land use and water resources?

4. Using question 3(i) as my response, the use of descriptive statistics which involves the presentation of raw data in an easy-to-interpret format that can be interpreted using sample statistics by producing a probability distribution table. This probability distribution table is then used to determine the spread of data using the empirical rule.

- ***Null hypothesis H_o***: South African farmers are not better livestock farmers than Ghanaian farmers.
- ***Alternative Hypothesis H_1***: South African farmers are better livestock farmers than Ghanaian farmers.

Since we are comparing the mean of two different populations, the **TWO SAMPLE T-Test** is suitable.

In the Two Sample T-Test individual observation are independent of one another. Data is normal and variance may be unknown and unequal. T-statistic, sample size and the P-value are used to determine the significance. P-value indicates the likelihood of the calculated t-statistics for the sample size used for both South Africa and Ghana.

5. Based on stud, in this case P-value is below the predefined significance level (that is, South African farmers are not better livestock farmers than their counterparts in Ghana), therefore we reject the Null hypothesis, H_o and accept the Alternative hypothesis, H_1.

In conclusion, there is a significance in the relationship between the South African farmer population and that of Ghanaian farmer with regards to livestock breeding.

6. Visualization type:
   a. Histogram: Examine the frequency distribution of the dataset
   b. Barplots: Compare items in the dataset
   c. Normal distribution: To determine the data spread around the central measure

7. Data on fertilizer use, pesticide use and the irrigated area was compared to national average values from the FAO and the World Bank is important to the research as affects crop yield. It is a variable that affects the variance of the value used in the research to the accepted national average.