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Statistics Pre-Requisite Summative Assignment

1. Nominal data for example gender

Continuous data for example age (although the dataset only contains whole years)

Ratio data for example income from farming/ non-farming activities

1. The sampling using the multistage stratified random sampling method would be very well suited to reduce sampling bias. The fact that samples were selected across a diverse agro-climatic conditions as well as having a ‘backup’ sample list in case some for the selected participants were not available formulates a good design. As noted in the background report, there is a high proportion of non-response bias either due to intentionally not wanting to answer questions or because the question was not applicable to the household. My inkling would be towards thinking that majority of the non-responses would be from smaller households for whom the questions may genuinely have not been relevant.
2. Has climate change negatively affected the average annual harvest of crops of farmers?

For households whose major income is from farming, what effect has climate change had on their net household incomes?

1. H0 – Climate change has had no effect on the average annual harvest for crop farmers

H1 – Climate change has had a negative effect on the average annual harvest for crop farmers

I would suggest using a one tailed t-test. This is because we only want to test to see if the average harvest from our sample have significantly seen their harvest reduced.

Since the population standard deviation is unknown, we would calculate the t statistic using the estimated standard deviation. Once we get this t value, we would look up the probability, P, of this t value on a t table using n-1 as the degrees of freedom where n is the sample size.

1. If the probability, P, calculated above is significantly lower than a pre-set value, then the null hypothesis may be rejected and the alternative hypothesis stands. If however the value of P is higher than the preset value, then we fail to reject the null hypothesis.
2. (i) A pie chart may be used to visualise the proportion of incomes from various activities

(ii) A line graph may be used to visualise the relationship between farming income and the farming outputs of households

(iii) A scatter plot may be used to study the relationship between use of pesticides and fertilisers against the amount of crops lost to disease and pests

1. The comparison of pesticides, fertilisers and irrigated area between the obtained data and FAO data may not be very appropriate due to reasons highlighted in the summary. The participants of the study report use of biological pesticides and fertilisers whereas the FAO data only accounts for inorganic fertilisers and pesticides used. Furthermore, FAO considers all arable land to calculate statistics including temporary meadows for pasture whereas the survey only considers land areas owned by the households. The values reported I feel are still important for research especially from the survey as these would give a more realistic feel of the amount of pesticides, fertiliser and water is used and its effect on the farm output