Question 1

Types of Variables

Categorical variables - Type of crops grown can be labelled as a categorical variable because it is a name or label and hence cannot be a qualitative measure.

Discrete variables - The plot sizes of the farm areas can be considered discrete variables as minute differences within similar plot sizes can be rounded up or down to the nearest discrete value.

Sampling Method

A multi stage sampling approach was used for selecting which farms would be used in the survey. On a national level, only those districts that were regarded as major agricultural districts were considered. Thereafter on the district level farms were clustered into small, medium and large sized farms and then samples were selected from these clusters so that there would be an even distribution of the different farm sizes. The method of sampling employed was appropriate for this survey as it gave the different farm sizes equal opportunity of being sampled.

Sources of Bias

58% of all data entries in the survey were NA. This meant that respondents either did not know the answer, did not want to answer or the question did not apply to them. Although the surveys were meant to be carried out as face-to-face interviews with independent interviewers to increase the response rate as well as to clear up the uncertainty that interviewees could have with questions, this however may have added in observer bias which could have intimidated the interviewee into not answering all questions truthfully. Another issue could have been that the farmers simply failed to remember certain key memories that the questionnaire was asking for hence introducing recall bias into the sampling as well.

Research questions

Does the number of livestock owned on a farm affect the percentage yield of crop per square hectare for the year?

Does the percentage net income from non-farm activities affect the amount of crops harvested?

Null Hypothesis

The number of livestock owned does not have an effect on the amount of crop harvested per square hectare for the year.

Alternate Hypothesis

The number of livestock owned does increase the amount of crop harvested per square hectare for the year.

Test to conduct

Simple Linear Regression would be the choice of test, because I want to explore the relationship between the independent variable, number of livestock, to the dependent variable, the amount of crop harvested. Because the data caters for farms of many different sizes, the dependent and independent variable would have to be normalized so that linear regression can be carried out without farmed plot size skewing the results of the test. I suggest dividing the harvest yield by the size of the farmed plot to get a percentage yield per square hectare. In this way we negate the inherent effect that large plot sizes would have on the linear regression model. Significance would be determined by performing a linear regression t-test and I shall work with a significance level of 0.05.

If significant a significant effect resulted, and the crop yield did increase then I would assume that the farmers could be using the waste from livestock as secondary fertilizer for their crops with positive effect

If no significant effect resulted, I could conclude that farmers either did not use the biological waste as a secondary fertilizer or the secondary fertilizer has no effect on the crops themselves.

Visualisations

1. Bar charts can be used to display the comparison of the number of male, female, and children labourers that worked per activity on the farm for each season.
2. A scatter plot can be used to show the amount of seeds used versus proportion of plot area cultivated with crop.
3. Line chart can be used to show the amount of crops lost due to disease and pests per season

Data on fertilizer use, pesticide use and the irrigated area

I think the research done to compare the national average values is important as it exposes the fact that the national average values are calculated based on inaccurate measurements. Organic fertilizers and pesticides are still farming aids that contribute to the overall crop yield and therefore should not be thrown out by the FAO or the World Bank.