1. Identify and evaluate the study design for this agricultural survey. How was the population sampled? Is the method used appropriate for the application? Are there any sources of bias?

The population was sampled using the clustered sampling technique, where the population is divided into random clusters or groups. Therein, the items in the cluster are studied.

The method used to sample was appropriate. The randomness of the samples reduce the bias that can be introduced, and as such will give a more comprehensive analysis of the population based on the sample. Additionally, after the first set of analysis, stratified analysis can be used to further group samples into shared characteristics.

The sources of bias in this project can be self-selection bias (where participants are willing to participate), non-response bias (where participants are not willing to participate)and convenience bias (where interviewers choose participants close to them,more convenient)

2. Develop 2 key questions that can be studied based on the dataset provided.

What household characteristics affect the yield in short/long term climate changes or extreme weather events? Is it the size, gender, education levels? If so, to what extent and in what way?
What seasonal activities have an impact on a yield in short/long term climate changes or extreme weather events?

3. Develop a plan for a statistical analysis of the data in response to one of your 2 key questions. What are your null and alternate hypotheses? Which tests would you use and why? Why are they appropriate? How would you determine significance?

Null hypothesis, Ho. Yield/returns from the farms are unchanged.
Alternate hypothesis, Ha. Yields are larger.

I would use the repeated-measures ANOVA hypothesis test. Why it is appropriate is I will be checking for the difference between three or more differences within the same subject(s).

I would determine significance after running post ad hoc tests to determine where these differences occur, and how they affect the yield.

4. How would you interpret your results if: 1) a significant effect resulted or 2) the results were not significant? What conclusion can you make about the population and your research question?

If a significant effect resulted, I would identify what variables affect my results and by how much, by running post ad hoc tests.

The conclusion about the population would be, the household characteristics, such as education, size affect the yield of the farms.