



# **Grow the Crop**

## **Handout 2 I**

### **Methods of Data Collection**

# METHODS/ ELEMENTS OF DATA COLLECTION

## Collecting Samples

There are various well-known and tried and trusted methods of sampling. Before we explore these different methods, let us first decide what types of things we could possibly sample and what those samples could tell us.

Agricultural Sampling: Removing and/or examining a portion of an entire set (i.e., examining three leaves per plant on 20 plants in a 11-ha field).

## Measuring

(It is expected that person doing this unit standard is competent in the units of measuring, and can assure to the performance of measurement under instruction and by delegation of such tasks).

The International System of Units (SI) All systems of weights and measures, metric and non-metric are linked through a network of international agreements supporting the International System of Units. The International System is called the SI, using the first two initials of its French name *Système International d'Unités*.

There are seven SI base units:

- the meter for distance,
- the kilogram for mass,
- the second for time,
- the ampere for electric current,
- the Kelvin for temperature,
- the mole for amount of substance, and
- the candela for intensity of light.

There are also other units of measure derived from SI – some of these that you might encounter include:

- the Newton for force and the Pascal for pressure;
- the joule for energy and the watt for power;
- the degree Celsius for everyday measurement of temperature;
- the traditional mathematical units for measuring angles (degree)
- the traditional units of civil time (minute, hour, day, and year);
- two metric units commonly used in ordinary life: the litre for volume and the ton (metric ton) for large masses;
- knot, units traditionally used in meteorology;

- the hectare
- the bar, a pressure unit

## Weighing

(It is expected that a person doing this unit standard is competent in the units of weighing, and can assure to the performance of measurement under instruction and by delegation of tasks).

## Observing

How and what to observe? Observation is one of the most important aspects of collecting Agricultural Data. It is a skill developed through dedicated action and meticulous methodology. A person doing this unit standard should be able to realize the importance of observation while collecting samples.

Observing: Observation basically means watching something and taking note of anything it does. For instance, you might observe a bird flying by watching it closely. The sciences of biology and astronomy have their historical basis in observations by amateurs, therefore Agricultural data is often much enhanced by focused observation.

Example:

1. In a study of family decision making, a researcher observed and recorded interactions between husband and wife as they decided on the brand of colour television to buy.
2. In an engineering study, data about the internal temperature of an oven were obtained by reading all instruments inserted into the oven.
3. In a marketing study, an analyst monitored customer flow in a department store by means of closed-circuit television.

The observation procedure has certain advantages:

- The directness of the procedure avoids problems such as incomplete or distorted recall.
- Data can be gathered more or less continuously over an extended time period.

Limitations of the method include the following:

- The observer (or the instrument) must be free of bias and must accurately record the events of interest. Human observers usually require thorough training so that they will record precisely what they observe and so that different observers will record the same events in the same manner.
- Individuals who are under observation and aware of this fact may alter their behaviour and, as a result, observations of their behaviour may be biased.

## Counting

Counting plays a very big role in collecting Agri-data. A farmer may decide to count the number of weeds or pests in a specific area, in order to determine whether or not chemical pest control is necessary.

- We also count the amount of fertilizer, and the number of plants or trees in any given area, in order to determine:
- **“How much” fertilizer we should give.**
- **“How many” fruit it delivered.**
- **“How much” money we spent to fertilize, pest control, etc. each and every plant.**

## Recording

Recording may take place in various forms, namely: in written form, in oral form, electronically, digitally, photographically, on tape or cassette. The most important point to remember about the recording of data, is that it should be

- Accurate, and
- Current (meaning up to date).

When this is the case, the integrity of the data is sound. If not, the integrity of the data is compromised and not reliable and might lead to incorrect interpretation and findings, as well as incorrect decisions.

## Scouting

Scouting, or monitoring pest populations, is part of an Integrated Pest Management (IPM) system. IPM prescribes treating the portions of a farm or field that have identified higher than threshold levels of pests, rather than treating the whole field, resulting in using less applied farm chemicals. The person doing this unit standard should acquaint him/herself with the methods of scouting on different crops, by sourcing training manuals or production manuals of each crop.

## Monitoring

Monitoring would imply to count and observe a certain data package or the collection of data over a certain time period.

## Questionnaires

Another method for gathering data is the questionnaire. A well-designed questionnaire is crucial to the success of a survey.

A well-designed questionnaire is usually anonymous, but allows you to collect background information about the person that is answering the questions. We usually ask questions regarding age, gender,

income bracket, number of children or race. These are called demographic questions. Demographic data helps you paint a more accurate picture of the group of persons you are trying to understand. For example, if you want to find out what type of chocolate is the most popular, you will probably get very different answers from males or females, teenagers or elderly people.

Two types of questions can be asked in a questionnaire: open ended questions or closed questions. **If you ask: "How old are you?" the person answering has to write an answer. This is an open-ended question.** The advantage of these questions is that you get a very accurate reflection. The disadvantages are that this type of questionnaire takes longer to complete and that you will find it very difficult to group the responses when you analyse the data later.

You could ask the same question as follows: Mark your response with a cross.

Your age	10-20 years	20-30 years	30-40 years	40-50 years	51 and older
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The person answering the questions does not have to write anything, but merely place a cross. This type of question is answered more easily and quickly. Analysis of data is also much faster.

Please see appendix 1 for more information about the different ways you can phrase questions in a questionnaire.

## Experimental results

If we perform an experiment in the field or in a laboratory, then we need to plan how we are going to record our data. We draw up a sample table during the planning phase. The table is then used during the collection of data. We need to decide what our independent, dependent and controlled variables are. For example, Mr Rose, a flower farmer wants to see if a new brand of fertiliser will give him more flowers. He will plant two plots with exactly the same plants, but give them different fertiliser.

The variables are as follows:

Independent variable: fertiliser type (i.e. either type A or type B)

Dependent variable: Number of flowers produced per plant

## Personal Interview

In a personal interview, an interviewer asks questions that are printed on a questionnaire and records the respondent's answers in designated spaces on the questionnaire form.

Example:

1. A household member was interviewed at home about purchases of toothpastes and mouthwashes and about family characteristics, such as income and family size.
2. A household member was interviewed over the telephone about television viewing, including viewing at the moment of call, the station viewed, and number of persons viewing.
3. A company's financial executive was interviewed at the office by a representative of a trade association about the firm's plans for capital expenditures in the coming year.

Both the advantages and limitations of securing data through personal interviews arise from the direct contact between the respondent and the interviewer. Advantages include the following:

- Persons will tend to respond when they are approached directly; hence, the personal-interview procedure usually yields a high proportion of usable returns from those persons who are contacted.
- The direct contact generally enables the interviewer to clear up misinterpretations of questions by the respondent, to observe the respondent's reactions to particular questions, and to collect relevant supplementary information.

There are several limitations of the personal-interview method:

- The interviewer may not follow directions for selecting respondents. For instance, if a member of the family other than the one designated is interviewed, a bias may be introduced into the results.
- The interviewer may influence the respondent by the manner in which the questions are asked or by other actions. A slight inadvertent gesture of surprise at an answer, for example, can exert subtle, undetected pressures on the respondent.
- The interviewer may make errors in recording the respondent's answers;

### Self-Enumeration

With self-enumeration, the respondent is provided with a questionnaire to complete, which often also contains necessary instructions.

Example:

1. A student who graduated from high school recently received a self-enumeration questionnaire through the mail, a page of which is shown in Figure 1.1, to provide information about educational activities since graduation.

2. A new magazine subscriber received a questionnaire through the mail to provide information about age, type of job held, income, and amounts of money spent last year on specified recreational activities.
3. A person completed a certificate of registration for a motor vehicle, supplying information on make, model, and year of car.
4. A purchaser of a toaster filled out the warranty card, giving information on family characteristics and on the primary method by which attention was directed to this appliance (e.g., word of mouth, television commercial).

Both the advantages and limitations of the self-enumeration procedure arise from the elimination of interviewers. The type of interviewer error discussed earlier is thus avoided. On the other hand, the absence of interviewers creates two serious problems:

- When a questionnaire is sent to a household or an organization, there is no control over which person answers the questions.
- The absence of interviewers can lead to low response rates. A low response rate can be a source of serious bias in survey results, because the persons who do answer the questionnaires are often not representative of the entire group contacted. The user of data collected by a self-enumeration procedure should therefore know the rate of non-response as one factor affecting the magnitude of the potential bias.

Where there is a material rate of non-response some follow-up of non-respondents will be valuable. In most well-conducted mail surveys, some or all of the non-respondents are contacted as a routine procedure. Non-respondents may be contacted by means of "reminder" letters, telephone calls, or special personal interviews.