HORTICULTURAL CROPS PRODUCTION

Level II

Learning Guide#18

Unit of Competence: Collect and Compile Production Data

Module Title: Collecting and Compiling Production Data

LG Code: AGR HCP2 M4 LO1-LG-18

TTLM Code: AGR HCP2 TTLM 0120v1

LO1:Identify data to be collected

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- Determining specific requirements of the data to be collected by discussion
- Obtaining and calibrating materials or tools require for data collection
- Identifying difficulties in collecting the data
- Communicating advice about proposed data collection
- Selecting, using and maintaining suitable PPEs
- Making checks to determine whether notices relating to site quarantine are in effect

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to –**

- Determine specific requirements of the data to be collected by discussion
- Obtain and calibrate materials or tools require for data collection
- Identify difficulties in collecting the data
- Communicate advice about proposed data collection
- Select, use and maintain suitable PPEs
- Make checks to determine whether notices relating to site quarantine are in effect

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the "Information Sheets 1-5".
3. Accomplish the "Self-check o**n page :11,13,15, 20, 22 and 24.**
4. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the self-check 1).
5. If you earned a satisfactory evaluation proceed to "other". However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
6. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Determining specific requirements of the data to be collected by discussion

1.1. Determining specific requirements of the data to be collected by discussion

1.1.1 Definition Terminology

♣ **Data** is unprocessed facts and figures without any added interpretation or analysis.

♣ **Information** is data that has been interpreted so that it has meaning for the user.

♣ **Knowledge** is a combination of information, experience and insight that may benefit the individual or organization.

♣ **Production** is "the step-by-step conversion of one form of material into another form through chemical or mechanical process to create or enhance the utility of the product to the user." Thus production is a value addition process. At each stage of processing, there will be value addition. OR as 'a process by which goods and services are created'.
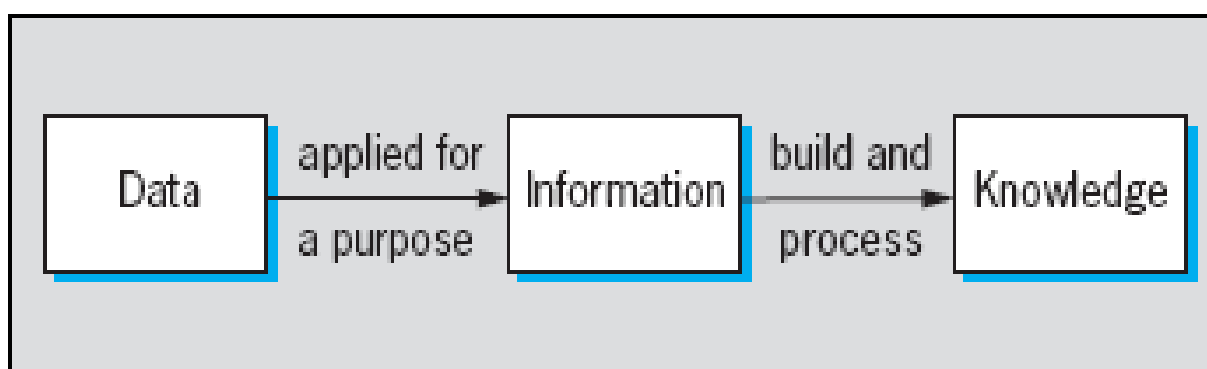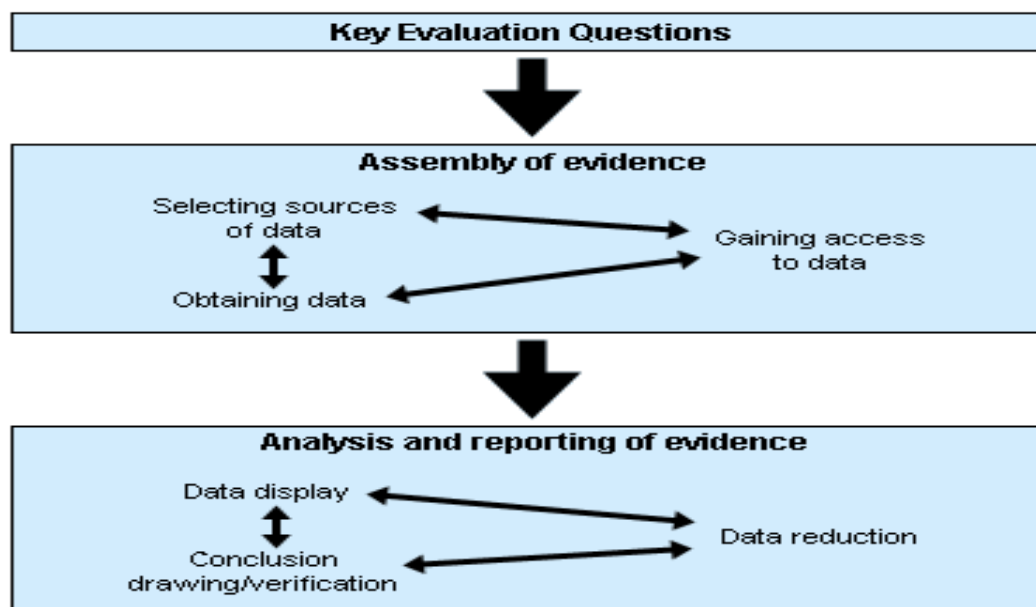

figure 1 show how data transfer to information

Data are facts which may or may not be processed (edited, summarized or refined) and have no direct effect on the user. By contrast, information causes the user to take an action that he or she otherwise could not have taken.

Information is simply defined as processed data. The distinction between data and information has pervasive implications for the study of information systems. If output from the information system fails to cause users to act, the system serves no purpose and has failed in its primary objectives. The process of data collection and analysis in evaluation can be termed 'data management' as described in the following diagram. Figure 1.2. Data Management Framework.

Key Evaluation Questions

Assembly of evidence

Selecting sources of data

Gaining access to data

Obtaining data

Analysis and reporting of evidence

Data display

Data reduction

Conclusion drawing/verification

Adapted from Owen, 2006, p.99.

The starting point for this process is the set of key evaluation questions identified in section. The data in an evaluation is collected primarily to address these questions. The data assembly process comes next and involves identifying the data sources, gaining access to the necessary data and obtaining the data in a useful form. Each of these elements of the process has a number of steps - too many to list here - however, it is useful to address several common questions.

1.1.2. Specifying data requirements

Data requirements of the data to be collected should be determined by discussion with the supervisor or by reading work instructions. Data Collection helps you and your team to assess the feasibility of your process. To do so, you must identify the key quality characteristics you will measure, how you will measure them, and what you will do with the data you collect. What exactly is a key quality characteristic?. It is a characteristic of the product or service produced by a process that customers have determined is important to them. Key quality characteristics are such things as the speed of delivery of a service, the finish on a set of stainless steel shelves, the precision with which an electronic component is calibrated, or the effectiveness of an administrative response to a tasking by higher authority. Data Collection is nothing more than planning for and obtaining useful information on key quality characteristics produced by your process. However, simply collecting data does not

ensure that you will obtain relevant or specific enough data to tell you what is occurring in your process. The key issue is not: How do we collect data? Rather, it is: How do we obtain useful data

Every process improvement effort relies on data to provide a factual basis for making decisions. Data Collection enables a team to formulate and test working assumptions about a process and develop information that will lead to the improvement of the key quality characteristics of the product or service. Data Collection improves your decision-making by helping you focus on objective information about what is happening in the process, rather than subjective opinions. In other words, I think the problem is... becomes... The data indicate the problem is...

1.2 Classification of Data

Data is any information collected as part of a research proposal and expressed as numbers. In practice, most measurements are classified into qualitative or quantitative data. Variables that give rise to non-numerical data are called qualitative variables. When the variable used to measure an attribute produces numerical observations; the variable is said to be quantitative.

Example: GPA. Quantitative variables can be further categorized according to the range of numerical values that a measurement can assume. A continues variable is one that can assume the infinitely many values corresponding to a line interval. Discrete variables can assume only a countable or discrete number of values.

Identify each of the following variables as qualitative or quantitative:

- ♣ The door chosen by a mouse in a maize experiment
- ♣ The winning time for a horse running in a given match.

The second is continues variable. It could be 121 seconds 121.51 or 121.25, While, the first is a discrete variable. It could take on any number of values 0, 1.2.

1.2.1 Qualitative Data

Qualitative data arise when the observations fall into separate distinct categories. Examples are:

- ➤ Color of eyes: blue, green, brown etc.
- ➤ Exam result: pass or fail
- ➤ Socio-economic status: low, middle or high.

Such data are inherently discrete, in that there are a finite number of possible categories into which each observation may fall. Data are classified as nominal if there is no natural order between the categories (e.g. eye color) or ordinal if there is an ordering of the data values (e.g. exam results, socio-economic status).

1.2.2 Quantitative Data

Quantitative or numerical data arise when the observations are counts or measurements. The data are said to be discrete if the measurements take separate values, which are often integers (e.g. number of people in a household, number of cigarettes smoked per day) and continuous if the measurements can take on any value, usually within some range (e.g. weight, height).

In discrete data only certain specific values are valid; points between these values are not valid. For example, counts of people (only integer values allowed), the grade assigned in a course (F, D, C-, C, C+, etc), Where as in continuous data all values in a certain range are valid. For example, height, weight, length, etc. Note that some packages label interval or ratio data as continuous. This is not always the case.

Quantities such as sex and weight are called variants because the value of these quantities varies from one observation to another. Numbers calculated to describe important features of the data are called statistics. For example, (I) the proportion of females, and (ii) the average age of unemployed persons, in a sample of residents of a town are statistics.

1.2.3 Continuous but discredited

Continuous data cannot be measured to infinite precision. It must be discredited, and consequently is (technically discrete. For example, a person's height may be measured to the nearest cm. This can cause problems if the level of discretization is too coarse. For example, what would happen if a person's height was measured to the nearest meter?

As a rule of thumb, if the discretization is less than 5% of the typical value, then a discredited continuous variable can be treated as continuous without problems.

Such data are inherently discrete, in that there are a finite number of possible categories into which each observation may fall. Data are classified as nominal if there is no natural order between the categories (e.g. eye color) or ordinal if there is an ordering of the data values (e.g. exam results, socio-economic status).

1.3 Source of production data

The sources of data structures and information needed to solve information research problems can be classified as either secondary or primary, determination of which is based on three fundamental dimensions:

* ♣ whether the data already exist in some type of recognizable format,
* ♣ The degree to which the data have been interpreted by someone, and
* ♣ The extent to which the researcher or decision maker understands the reason(s)

Sources of secondary data include:-

* ➢ Inside a company,
* ➢ At public libraries and universities,
* ➢ On Internet Web sites,
* ➢ Purchased from firms, specializing in providing secondary information and so on.

1.3.1 Primary data represent "firsthand" raw data and data structures that have not had any type of meaningful interpretation. Primary data are the result of conducting some type of exploratory, descriptive, or causal research project that employs either surveys or observation to collect the data. Primary data are collected and assembled specifically for a current information research problem

One of the basic tasks of any research is to obtain information that helps a company's management make the best possible decisions. Focusing on the particular problem to be analyzed, the researcher needs to determine whether useful information already exists, how relevant the information is, and how it should be obtained. Existing sources of information are more widespread than one might expect, as illustrated in the chapter opening example, and should always be considered first in any data collection procedure.

1.3.2 secondary data:

refers to data not gathered for the immediate study at hand but for some other purpose. There are two types of secondary data:-internal and external.

Internal secondary data are data collected by a company for accounting purposes, marketing activity reports, and customer knowledge. Customer knowledge information is provided by customers for purposes that may be outside the any function of an organization. For example, information may be provided to engineers, logistical support personnel, or information technology departments for issues relating to product improvement, packaging, or Web registration. Nonetheless, data of this type, if properly warehoused and categorized, can be an invaluable form of secondary data for decisions

as they relate to customer relationship management (CRM). CRM focuses on customer involvement and interactions throughout many of the processes of an organization.

External secondary data consist of data collected by outside agencies such as the federal government, trade associations, or periodicals. External data may also be available through standardized research services such as NPD Research's food consumption reports, store audits, or consumer purchase panels. Finally, secondary data may be obtained from computerized data sources. Computerized secondary data sources are usual\y designed by specific companies and include internal and external data combined with online information sources. These computerized information sources may include information vendors, private Web sites, mailing lists, or direct marketing clearing and fulfillment services.

1.4 Collecting information on crops

Information on income, labor and other costs involved in producing individual crops can be useful in many situations. It can be useful for:

- Scientists in determining suitable topics for research.
- Planners in estimating the probable returns of a project.
- Farmers in making farm management decisions.
- Extension workers and farmers as basis for discussions aimed at finding ways to improve the farm economy.

1.5 Data collection

Crop information can be collected in various ways. The method used depends on available local resources, purpose and the degree of accuracy needed.

1.5.1 Data collection workshop

Gather farmers (men and women) in the area for a 1-2 day workshop. Small groups of 3 to 5 farmers should discuss a specific crop and fill out the information sheet. Crop data can be presented and discussed among the participants.

- ♣ Individual interviews of farmers by extension agents. This is a time-consuming way to gather information. The data may not be any more accurate than those collected through a workshop or group meeting.

1.5.2 Collection by farmers

Interested individual farmers collect information by themselves as they carry out their farm activities. Initial supervision by the local extensionist is needed to ensure that the data are

recorded correctly. Once every 3, 6 or 12 months, the extensionist can gather the information from the farmers for analysis and presentation.

Data to collect

- ♣ Yields
- ♣ Fertilizers and pesticides management, use, quantities and costs
- ♣ Labor use days for different activities, cost per day
- ♣ Other inputs, costs
- ♣ Income, prices received, quantities sold
- ♣ Constraints in the cultivation of individual crops
- ♣ Marketing.

How will the information be collected and analyzed?

- What/who are the data sources?
- What types of data are most appropriate?
- What are the most appropriate methods of data collection?
- How will the data be analyzed and presented in order to address the key evaluation questions?
- What ethical issues are involved in the evaluation and how will they addressed?

1.6. Data collection strategies.

You have a number of ways to collect data but there is no one single best way. The decision about which approaches to use depends upon:

- ✍ what you need to know
- ✍ where the data reside
- ✍ resources and time available
- ✍ complexity of the data to be collected
- ✍ Frequency of data collection.

Data collection general rules

The following are general rules to help you with data collection.

- • Use available data if you can.
- • If using available data be sure to find out how earlier evaluators:

✍ collected the data

✍ defined the variables

- Ensured accuracy of the data, If you must collect original data:
- establish procedures and follow them (protocol)
- maintain accurate records of definitions and coding
- Pre-test, pre-test, pre-test
- verify accuracy of coding, data input

Self-check -1	Written Test

Name:--- Date:--------------

Directions: Answer all the questions listed below.

1. List the general rules to help you with data collection(5pts).

2. Define the following terms(10pts).

      a. Data

      b. Information

      c. Primary data

      d. Secondary data

Note: **Satisfactory rating - 15 points**   **Unsatisfactory - below 15 points**

Name: _____   Date: _____

Short Answer Questions

   1. --

   2.

   a.--- --

   b. --

   c. --

   d. --

Information Sheet-2	Obtaining and calibrating materials or tools require for data collection

2.1 Materials or tools required for data collected are obtained, and where necessary, calibrated

➢ What/who are the data sources?

In many ALTC projects, students and staff will be the primary data sources but documents and other stakeholders may also be useful sources of information. Due to the small size of many ALTC projects, all students and staff participating may be able to be approached to provide data and sampling therefore will not be an issue. If the population of any data source is too large then sampling will be required. Probability sampling (random or some variation of it) will usually be the best approach for quantitative information and explanatory analysis, whereas qualitative information and descriptive analysis are often served better by non-probability (purposive) sampling (see social science research texts for more detailed guidance on sampling).

The ready availability of existing data may make it generally preferred in evaluation studies, especially if it is accepted as appropriate and of high quality by stakeholders. However, where existing data is of poor quality or not available then new data must be collected, and this is generally more expensive and time consuming. Issues of the quality of any data used in the evaluation should be explicitly addressed in reporting the evaluation.

Directions: Answer all the questions listed below.

1. List the materials required for collecting data?(10)

Note: **Satisfactory rating - 8points**   **Unsatisfactory - below 8points**

Name: _____   Date: _____

Short Answer Questions

1.

Information Sheet-3	**Identifying difficulties in collecting the data**

3.1. Difficulties that may be encountered in collecting the data are identified and advice sought from the supervisor if needed

➢ **What types of data are most appropriate**?

The data to be collected will depend on the key evaluation questions.

❖ **Key issues about measures of data collection**

When you collect data, you will need to keep these key issues in mind:

- ✒ Are your measures credible?
- ✒ Are your measures valid?
- ✒ Are your measures measuring what counts?
- ✒ Are your measures reliable?
- ✒ Are your measures precise?

The question that you ask must contain the following;

- ♣ Units in which measurements are to be made
- ♣ A time frame for the measurements
- ♣ A location

❖ A clear definition of what is to be measured In most evaluations, a combination of qualitative and quantitative information is collected, as required by the different questions being addressed. There is no a priori preference for one type of data over another, and both quantitative and qualitative data have standards of quality.

Self-check -3	Written Test

Directions: Answer all the questions listed below.

1. List the condition should be considered (5pts)

Note: **Satisfactory rating - 5 points**   **Unsatisfactory - below 5 points**

Name: _____   Date: _____

Short Answer Questions

1.

Information Sheet-4	Communicating advice about proposed data collection

4.1. Advice about proposed data collection is communicated to others as required

What are the most appropriate methods of data collection?

The process of actually collecting the data is often the focus of most discussion and controversy but if the process of identification and access is properly addressed, the process of obtaining the data is much less problematic. The objective of the evaluation is to answer each of the key evaluation questions, so a matrix might be developed mapping each question against potential sources of information. The matrix enables identification of overlaps in data collection and the development of more efficient processes.

Figure 4.1. **Sample Data Source Matrix**

Key Evaluation Question \ Source of Information	Steering Committee members	Students	Staff	Existing documents	Other stakeholders
1. To what extent has the project been implemented as planned?	✓	✓	✓	✓	✓
2. How well has the project been co-ordinated across different institutions/schools?	✓		✓		✓
3. How appropriate were the project activities in relation to staff capabilities and the institution's ITC structures?	✓	✓	✓	✓	✓
4. How well have the needs of staff been met?			✓		
5. To what extent have students been engaged in the project activities?		✓	✓		
6. To what extent have the intended student learning outcomes been achieved?		✓	✓		

4.2. Collect and organize agricultural/production data

What is Agricultural / production Data?

The process of gathering information such as profit margins per crop type and cultivars, pest and disease infestation, weather and climate information, costs, economic conditions etc and analyzing it to be able to find patterns that will help as work more efficiently, sustainably and profitably on a farm.

Agricultural data could be any of these items listed below:

Occurrence of pest and disease infestations	Weather and climatic information
Rainfall & Soil sample data	Costs of agricultural inputs
Yield data	Prevailing economic conditions in the sector, country
Production costs per crop	Soil and fertilization costs and applications
Pest and Weed Control application	programs and statistics
Non-target species data	Crop quality margins
Agronomic data	Profit margins per cultivar / per crop /per block / per orchard / per Hectare
Agricultural photographic data	

4.3. The reasons why we would collect Agricultural Data

It is always useful to have detailed records and data of patterns of the environment and process of the biophysical environment in order to ensure that we make optimum decisions in order to maximize profits, production and quality, and to reduce risks and problems in production activities. Detailed records of data need to be integrated, compared and correctly and accurately reported on, in order to make data useful and applicable in an agricultural setup.

Patterns of the environment include rainfall, climate, dry cycles, original vegetation, seasons, movement patterns of animals, etc. Processes of the biophysical environment include the interaction and the relationship between food webs, human activities, soil, climate, water, plants, animals and solar energy.

4.4. Elementary Methods of Data Collection in Agriculture

1. Interpreting a Gauge

The most commonly read gauge on a farm, are normally a tensiometer, rain gauge etc. Tensiometer is a porous, permeable ceramic cup connected through a tube to a manometer. It is a device for estimating soil moisture levels by measuring the negative hydraulic pressure of water in the soil.

2. Measuring

When applying the basics of collecting Agricultural Data, you will almost constantly be required to measure. But measurement may mean different things to different people. So let's explore a few of the basics to ensure we all agree to the same terminology:

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. 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 liter for volume and the ton (Metric ton) for large masses;
- Knot, units traditionally used in meteorology;
- The hectare and the bar, a pressure unit

4.5. Counting, and Observing,

4.5.1 Observing: Observation basically means watching something and taking note of anything it does**.**

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.

4.5.2 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.

4.5.3 Scouting

Agricultural scouting is systematic, regular monitoring of a crop. 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.

4.5.4 Monitoring

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

Name---   Date------------------------

Directions: Answer all the questions listed below.

1. List the the agricultural data should be collected and its purpose (6pts)

Note: **Satisfactory rating –6points**   **Unsatisfactory - below 6points**

Name: _____   Date: _____

Short Answer Questions

1.

Information Sheet-5	Selecting, using and maintaining suitable PPEs

5.1. Suitable personal protective equipment (PPE) is selected, used and maintained where required

> How will the data be analyzed and presented in order to address the key evaluation questions?

According to Owens's model, the second part of data management is analysis and reporting, which has three components; data reduction, data display and conclusion drawing and verification. The general data analysis process in evaluation is one of reduction- that is, 'the process of simplifying and transforming the raw information according to some logical set of procedures or rules. There is a wide range of processes for data reduction for both quantitative and qualitative information. The processes used must be explicitly described when reporting the data analysis results. There are two general purposes for data analysis in evaluation; description and explanation. Both are important because description enables the audience to understand the project, its intended processes and outcomes, and the extent to which these were achieved, whereas explanation provides evidence about the underlying logic of the project and the extent to which it is sustainable, transferable and/or reproducible.

The display of data is a process of organizing the information in ways that lead to the drawing of explicit and defensible conclusions about the key evaluation questions. In many evaluations, conclusions are the endpoint, however in others; the evaluators go further to offer recommendations about the project. The former require placing values on the conclusions such as stating the project is successful or not, whereas, the latter are advice or suggestions for courses of action made to decision makers.

5.2. Preparing materials, tools and PPE

> Materials and tools for data collection, recording and storage which includes paper, pens, tally forms, flipcharts, computers, data loggers, and bar code scanners should be maintained and prepared

> Suitable personal protective equipment (PPE)like hat, boots, overalls, gloves, apron, waterproof clothing, spray clothing, goggles, respirator or face mask, face guard, hearing

protection, sunscreen lotion and hard hat should be selected, used and maintained where required.

Self-check -5	**Written Test**

Directions: Answer all the questions listed below.

1. List the PPE and its purpose (10pts)

Note: **Satisfactory rating 10 points**   **Unsatisfactory - below 10 points**

Name: _____   Date: _____

Short Answer Questions

1.

Information Sheet-6	Making checks to determine whether notices relating to site quarantine are in effect
	23

6.1. Checks are make to determine whether notices relating to site quarantine are in effect and, where required, site quarantine procedures are followed

> **What ethical issues are involved in the evaluation and how will they addressed**?

Ethical issues often arise in the data management process described above e.g. in the selection of data sources, obtaining the information or reporting results. The main issues which are likely to arise include appropriate methods of collecting, analyzing, storing and reporting data from students to protect their confidentiality and anonymity, ensuring students and staff are not impacted unfairly by the evaluation activities (avoiding interruptions to the learning and teaching processes), and unfairly disadvantaging students who are not receiving the project benefits.

Self-check -6	Written Test

Name-- Date:---------------------

Directions: Answer all the questions listed below.

1. What is the relationship between quarantine and Selection of data sources (8pts)?

Note: **Satisfactory rating –8 points**   **Unsatisfactory - below 8 points**

Name: _____   Date: _____

Short Answer Questions

1.

HORTICULTURAL CROPS PRODUCTION

Level II

Learning Guide#19

Unit of Competence: Collect and Compile Production Data

Module Title: Collecting and Compiling Production Data

LG Code: AGR HCP2 M4 LO2-LG-19

TTLM Code: AGR HCP2 TTLM 0120v1

LO2: Record production data

Instruction Sheet	Learning Guide 19

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- <mark>Purposing of data recording</mark>
- Recording methods and formats
- Recording requirements

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, **you will be able to:**

- <mark>Purposing of data recording</mark>
- Recording methods and formats
- Recording requirements

Learning Instructions:

1. Read the specific objectives of this Learning Guide.

2. Read the information written in the "Information Sheets 1-2".

3. Accomplish the "Self-check **in page :30 and 39.**

4. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).

5. If you earned a satisfactory evaluation proceed to "other". However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.

6. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Recording production data in the correct format

1.1. Recording of data

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. Before you begin to collect data you need to plan how the data will be recorded. Sometimes data is simply listed.

Example:

The yield per hectare of 10 different potato varieties in ton: 15, 20, 18, 19, 21, 30, 30, 29, 31, 28, When data is listed it is very difficult to make sense of the information, especially when there are a lot of numbers. The most convenient way of recording data is by using a table. A table consists of rows and column. Usually the independent variable is found in the first row. The independent variable reflects the categories that you have chosen. The dependent variable is found in the columns. The dependent variable is the measurement that belongs with the matching independent variable. If there are many independent variables, then the independent variable can also be placed in the first column for the sake of convenience. You must always be aware which one is the independent variable!!!

Note: Every table needs a detailed heading.

Example:

Table:1 shows the amount of profit of a farmer from sells of different crops of 0.5hectar over the last six months

You decided to record for the months January to June.

Months	January	February	March	April	May	June
Profit(birr)	80,000	50,000	100,000	40,000	20,000	30,000

The amount of profit in January was 80,000. The profit depends on which month you chose to measure in. The actual profit is the dependent variable and the month is the independent variable.

1.2. Interpretation of data

The interpretation of data is very simple if you are able to work through it systematically. The most important features of data are:

- Frequency
- Average
- Modus
- Median
- Range

Frequency is the number of times a certain value appears in a series of data. Example: Let us take the yield per hectare of 10 different potato varieties in ton: 20, 19, 20, 19, 20, 20, 21, 19, 21, 22. The information given in the list does not make much sense and needs to be better organized. We could organize the data in a frequency table, i.e. a table that shows us how often a certain amount of yield. If we put this series of data in a table, then the frequency would be much clear:

Number Tally Frequency

Number	Tally	Frequency
19	III	3
20	IIII	4
21	II	2
22	I	1
		10

Note: When you are using the tally system to determine the frequency, you will draw a line for every time something occurs, i.e. I. When it occurs four times, you draw four lines, i.e. I I I I, but when you reach the fifth occurrence, you do not draw the fifth line next to the other four, but you draw a line through the other our lines to show that you have reached 5, i.e. I I I I. It makes it much easier to count when you reach the end.

Average: Adding together all the values and then dividing it by the number of items calculate the average of a set of data. The average is also known as the **mean**.

Example:

We will use our previous set of data: 20, 19, 20, 19, 20, 20, 21, 19, 21, 22

To calculate the average, we first add together all the values:= 180

Then we count how many items are there, i.e. 10

Average = (Sum of all the values) ÷ (number of items)= = 180 ÷ 10 = 18

The average yield of potato varieties is 18 ton.

Mode: is the number that occurs most frequently in the series of data. In the series of data below, the mode is 20.   20, 19, 20, 19, 20, 20, 21, 19, 21, 22

Median: in a series of data is the number that is exactly in the middle, or halfway between two numbers in the middle.

Example: From our set of data: 20, 19, 20, 19, 20, 20, 21, 19, 21, 22

We re-arrange it in chronological (numerical) order: 19, 19, 19, 20, 20, 20, 20, 21, 21, 22

Then what is the median?

Range: is the difference between the highest number and the lowest number in a set of data.

The range in the set of data we have been using as an example will be as follows:

19, 19, 19, 20, 20, 20, 20, 21, 21, 22. Range = Highest Number- Lowest Number = 22-19 = 3

Directions: Answer all the questions listed below.

1. what is the importance of recording data ?(5pts)
2. Define the following terms (12pts)

    a) Average

    b) Mode

    c) Median

    d) Range

Note: **Satisfactory rating -15 points**   **Unsatisfactory - below 15 points**

Name: _____   Date: _____

Short Answer Questions

1.

2 .   a.

            b.

            c.

Information Sheet-2	Making records legible, accurate and complete

2.1 Records are legible, accurate and complete

In the description of the recording Techniques contained in the appendices, some of the details given may seem petty and supper fulvous, they are deliberately in clouded, However, because they are often not appreciated, and one of the most important reasons for farmers not keeping records that would be valuable to them is not they do not know precisely what needs to be done. Sometimes recording is started but later abandoned because it proves to be too difficult or not to be giving the information required often these faults can be rectified by a dears appreciation of recording procedures.

Purpose of recording

- ♣ To check on performance
- ♣ To guide future reference
- ♣ To provide planning data

Some excuse themselves from paying proper attention to this side of mag't by stressing the " historical " aspect of recording they argue that the information relates to what is past, whereas a manager must constantly be looking ahead net wasting a time on past mortems, or in dreaming might have been. However, it is only through recording that a check past plans, and to a large extent this is a continuous, contemporary process, not at all, historical. Furthermore, records should reveal the strength in a business that can be exploited and the weakness that must be removed. Finally, records provide data for use in marketing or revising future plans.

Planning involves both selecting the right technique & obtaining the necessary data. It is usually the later that provides the greater problem for advisers "standard data are available to some extent but are rarely sufficiently detailed to be applied with full confidence to individual. Even if standard data were available in for greater detail than at present, circumstances on the individual farm would frequently fall b/n different categories, since it would be optimize to expect data to be provided to cover a continuous range of differences, Furthermore, it would be virtually impossible to cover one vital variable, except very crudely namely, Quality of management. This varies according to such factor as skill, experience, personality and objectives.

As a result, the majority of advisors would argue that the most suitable data to apply are there obtained from the farm itself, from its past records; these should obviously reflect the particular conditions of the individual farm and the quantity of its labor and management. UN fortunately the data can never be perfect.

Apart from possible errors and in accuracies in recording, circumstances and people alter. Changes accrue in technology and in the prices of both inputs and out puts, the composition of the labor staff may change, the farmer or manager's experience will Increase and his objectives and motivation may alter. Nerveless data from the farm itself still provides the best available guide to the future, even though such information may need to be" normalized ", because of exceptional circumstance in the past or changing conditions, while, in any event, future price exceptional must be applied to the physical data recorded.

However, there is no point in recording simply for the sake of it. Records should not be kept unless they can be profitably used. Recording incurs cost as well as providing returns,

whether the cost consists of fees for professional assistance or the value of the time of the farmer, manger or members of his family, which could either have been used for other work on the form or for leisure. The law of diminishing returns applies to money or the value of time spent in recording just as it does to any other variable researches, and there comes appoint where the further records, extra detail or additional accuracy are not sufficiently useful to be worth the extra cost incurred to provide them. Good production data should satisfy the criteria of:-

- ♣ They should serve a definite purpose
- ♣ Be easy to complete
- ♣ Be up to date

So that any action needed can be taken as early as possible

2.2 Method of data recording

Data are recorded in different methods: - for instance

A. Field data records: -

can be kept in on ordinary bound ledger, or aloes le file, or on cards. There is no page or cord, per field per year. The virtue of loose leaf files or cords is that successive years for each field can be put together to make continuous record. Also, data for and single crop can easily be assembled as required.

If only a few items are recorded, one sheet or card may be used for more them one year, thus saving on space requirement over a period of years, these records will from a type of diary for each field for subsequent reference. The items to be recorded include

- ♣ Crop Grown
- ♣ Variety
- ♣ Fertilizers and Sprays Used
- ♣ Data Sown
- ♣ Date of Harvested.

Yield should be recorded as accurately as possible without going to excessive trouble trying to keep lost separate. Often these can be only roughly estimated, as is usually the case with cereals, but an approximate figure is undoubtedly better them nothing, Notes should be added, recording observations about the field, E.g. concerning drainage, fertility or soil, pea laities many of these items may first be written in note books carried by a member of the form staff the head tractor driver, arable fore man or the farm manager and subsequently transferred to the field records.

A. Rotational data record:-

This should be kept an a single sheet of paper, unless the number of fields is so large as to make it impossible the names and/or numbers of the field(and their areas if required)are listed down the left hand side and the remaining space is divided in to. Say Ten columns, representing, successive years, the crop grow on each field in each year is entered in the appropriate space.

B. Labor data recording

On farm with elaborate grapping systems and at peak times(and on many horticultural units labor may be fully deployed on essential productive work for most on even all of the year) the task may be recorded on time sheets, but these are laborious to analysis where a large staff is employed and are often in accurate, time sheets are more useful as a means of recording ordinary time and ever time worked for calculating wages, and as a means of transferring useful information from the field to the office, them for recording the labor hours spent on different jobs. On farms with a limited number of major tasks at peak times, the information required about these can be recorded in a way that requires far less subsequent analysis than time sheet, the method involves recording certain details of each task, either in a pocket book kept by the head tractor driver, arable foreman or manager, or specially prepared small cards, one page or cord is needed for each job, unless it covers along period, in which case two or more pages cards, each covering one or weeks, will be required per job, the task such as main crop harvesting is written at the top. Normally there will be one entry per day.

- Columns are needed for the date, the gang size (i.e. numbers of workers employed, hours worked and hectors completed.
- Sometimes, the latter can be bracketed over more than one day, e.g. for the completion of a whole field; other items which might be useful subsequently can also be entered, either at the top, I on extra column, or as footnotes, eg. The type of machine employed, the number of tractors and trailers in use, Notes can also be added, for latter reference, relating to weather and soil conditions, especially if these are exceptional, the pages from the pocket book or cards, which can be kept with in as Tift covered pocket book during the period of recording, should be filed, in chronological order, either by crop or by operations.

2.3 Preparing appropriate format for data recording

For data recording Appropriate format preparation is Necessary: - Data are recorded in different waist may be undisruptive way or in way or in table or way or in graphical, chart, figurative.

E.g.:- Tabular format

Name of field	Variety No	Ma	Crop sown					
			1990	1991	1992	1993	1994	Etc
Snope	307	15	Coffee					
little chequers	286	12	Coffee					
Great chequers	293	13	Spice					
Upper west well	312	16	Tea					
Dale Hill etc	301	17	Spice					

Format controlling coffee growth

Spacing(m)	Plants/ha	Coffee type	No of sucks	Date of plotting	Date of measuring the plant	Height of plant
2x2 2x1.8	250 1000	Open Compact	3 4	10/2/2001 10/4/2001	Monday September Friday October 16/2002	6cm 9cm

NB. Format for recording data is differ according to the user and their Necessary for example format used for recording daily laborers controlling and recording data for plant management is not the same.

2.4 Recording legible, accurate and complete data

Legible datum are datum that readable or easily understandable datum, during recoding process. making the recording legible is und out full for any decision making, the data must be free from errors incorrect information leads to wrong conclusion.- Accurate date recording describes whether information represents datum represents a situation, level or state of an event as it really in information is relevant if an individual needs it in a particular decision making or problem solving situation.

Complete data recording

If a given set of data that recorded a user everything that need to be known about a particular situation or event, we say that it is complete data recording. If a recording on the other hand leaves on individual with a number of unsound questions, it is an in complete set of recording.

2.5 Keeping data for future analysis

2.5.1 Farm records

Farm records are an important tool in farm management. In Africa where a large percentage of farmers are illiterates and unwilling to enlist the services of paid clerks, record keeping is nonexistent. In schools students take annual examinations, the result sheets carefully as they help them to assess the performance of their children to know whether their children are progressing or retrogressing. The same is applicable to farmers. Record keeping helps them to assess the progress of their ventures. There are various reasons why a farmer should keep farm records. These reasons may be summarized as follows. In many advanced countries the law requires farmers to keep records. Such records clearly show the income earned from the farm and on this the tax assessment authorities can determine the amount of tax the farmer will pay. Secondly, farm records, when properly kept should provide the farmer with valuable information which is vital for future farm budgeting and planning Thirdly, farm records will enable the farmer to know what each enterprise contributes to the overall progress of the farm. Fourthly, good records will enable the farmer to locate the weak-points in his business Fifthly, farm records will enable the farmer to know whether the business is progressing or lagging behind from one year to another.

Sixthly, farm record s should tell the farmer where his money goes and where it comes from. Again, if farmers keep records, they will find it easier to make comparisons amongst themselves and hence be in a position to solve complex managerial problems. Finally records can enable the farmer to obtain loans having established the need for record keeping, it is now necessary to list types of records a farmer is expected to keep.

2.5.2 Inventory record

Here the farmer lists everything he owns - examples: buildings, feed, land, and livestock, produce in storage, miscellaneous supplies, growing crops as well as all the money he owns. In addition to listing the above items, the farmer also has to estimate their value in monetary terms.

It is important to note that growing or standing crops are included in inventories only if such

crops were purchased. Inventories should be taken twice in a year - at the beginning and at the end of the year, though with experience the farmer learns to keep inventories only once in the year.

2.5.3 The cash record

This simply refers to records of financial transactions, receipts and payments. These receipts and payments are recorded in what is popularly referred to as a Cash Book. The receipts and payments of a farmer are of two kinds -; those made by cheque and those made in cash. Transactions made by cheque should appear in the main cash book while those made in cash are recorded in the petty cash book. In the main cash book, the farmer should record the receipt on the left hand page, while he records payments made on the right. On the whole a simple cash book can be divided into four columns.

Column 1: Date on which the farmer transacted the business

Column 2: The source of the income received or the purpose for which payment was made

Column 3: The amount of income received

Column 4: The amount of payment made

A Simple cash Book

Date	Amount of income particulars	Amount of payment received	Amount of payment made
7/2/2010	100 dozens of eggs sold at £1 a dozen	100	--
9/2/2010	10 bags of feed purchased	----	$50
Total		$100	$50

2.5.3 The non-cash record

As the name implies, this is a record of the transactions made by the farmer some of which do not necessarily involve physical cash. Payments in kind are very common in African countries. Some items to be recorded in the non-cash record a~1d which may be paid for in kind are - yarn or other food eaten by the family, family labor, wages, rent and taxes. These are valued and their monetary equivalent recorded. These are then deducted from the gross profit so as to arrive at the real or net profit.

A non-cash record may be made up of live columns as shown below:

Non-Cash Record

2.5.4 Records of production

Most African farmers are involved in crop and livestock production. Records of these transactions ought to be, kept. Such records, if properly kept help the individual farmer to study his entire business as well as the efficiency with which he produces specific kinds of crops and livestock.

With reference to the crops produced, the farmer should keep a record or the number of acres planted and here a map of the farm should be made and kept carefully. Immediately after harvest the farmer should record the number of bags harvested. The harvest should be valued in monetary terms and this recorded.

An Example of a crop Record

Date	Field No.	Hecrarage	Kind of crop grown	Variety planted	Materials applied			production		
					Kind	Amount	Value	Kind	Amount	Value
3/3/2010	1	0.4	Maize	NSI	Labor cultivation	5	$2			
15/8/2010	1	0.4	Maize	NSI	Labor	6	$18		400	£8000
15/8/2010	1	0.4	Maize	NSI	harvesting			Maize	bags	

In all activities such as device data read out, data display, report generation, export and import of data the user is guided through the set up options by wizard steps. An on-line help function is available for each step. Reports that have already been prepared can be saved as a template and are therefore available for a later data analysis. Moreover, the intuitive user guidance is supported by an attractive and modern user interface. Movable, individual windows make it possible to simultaneous work on several monitors. This enables the comparison of all sorts of reports as well as tables and graphics with each other. Highest security by manipulation proof data storage and extensive user administration

2.5.5. Production Reporting Highlights

- Supports capture of materials, packaging, and labor consumed and finished goods produced by routing process step

- Manufacturing variances can be recorded and analyzed
- Supports separate data capture of finished goods production and inventory put away
- Supports one-step production reporting for organizations that prefer more simplistic recording of finished goods with simultaneous back flush at standard of materials and labor consumed
- Supports recording of machine downtime and production scrap for accurate costing and root cause analysis
- Supports tracking of employee exposure to hazardous chemicals
- Supports lot tracking from ingredients through intermediates to finish goods
- Supports serial number tracking from components through subassemblies to finished goods
- Supports reporting of disassembled manufactured goods, kits, and assemblies
- Supports production recording in multiple units of measure
- Supports catch weight processing

Name--   **Date**----------------------

Directions: Answer all the questions listed below.

     1. List the purpose of accuracy of recorded data(5pts)

Note: **Satisfactory rating –5 points**   **Unsatisfactory - below 5 points**

Name: _____   Date: _____

Short Answer Questions

      1.

HORTICULTURAL CROPS PRODUCTION

Level II

Learning Guide#20

Unit of Competence: Collect and Compile Production Data

Module Title: Collecting and Compiling Production Data

LG Code: AGR HCP2 M4 LO3-LG-20

TTLM Code: AGR HCP2 TTLM 0120v1

LO3:Present and store production data

Instruction Sheet	**Learning Guide 20**

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- Presenting production data in the correct format
- Storing production data sheets
- Downloading or entering production data into a computer

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to –**

- Present production data in the correct format to meet specific requirements
- Store production data sheets according to enterprise procedures.
- Download or entering production data into a computer

Learning Instructions:

1. Read the specific objectives of this Learning Guide.

2. Read the information written in the "Information Sheets 1-3".

3. Accomplish the "Self-check **in page -.**44,51 and 58

4. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check).

5. If you earned a satisfactory evaluation proceed to "other". However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.

6. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Presenting production data in the correct format

1.1. Methods and ways of data representing and/or presenting

1. Graphs

Graphs are visual representations of what is written in a data table. There are many types of graphs that we can use and it usually depends on what you need to represent and to whom the representation is made.

Example: Bar graph, Histogram, Pie Chart, Broken Line Graphs, Pictogram

2. Pictogram

Pictograms are graphs that show us data by using identical pictures instead of figures and lines.

Example

3. Bar graphs and Histograms

A bar graph and a histogram can be used when the data needs to be grouped into periods and the frequency of each period needs to be clarified. The difference between the bar graph and the histogram is as follows: when we draw a histogram, we do not leave spaces between the columns as with the bar graph. (Learning tip: the words bar graph have a space. Bar graphs have spaces.

The word histogram has no space, the actual graph has no spaces.)

4. Bar graphs are used when the data classes are not continuous e.g. in comparing the annual yield of carrots, tomatoes and potatoes of a vegetable farm. There is no intermediate between carrots and tomatoes. The classes are different from each other.

Example of a bar graph:

A farmer wants to compare the amount of fuel used by a number of vehicles on his farm. He has summarized the data in a table 1.1

Vehicle	Tractor	Truck	Moter cycle	Car
Litres of fuel used in January 2018	730	100	545	150

He must construct a bar graph, because a truck is very different to a car.

Present the above data using bar graph and pie chart.

5. Histogram

Histograms are used if the data classes are continuous. For example, a farmer wants to see how many tons of carrots a certain field produced per year from 2007 to 2013. There are no spaces between the bars, because 2007 borders on 2008. Time is continuous. He could also use a line graph.

Example of a histogram:

The same farmer wants to compare the amount of fuel used by his tractor each month from January to June. Table 1.2

Months	Jan	Feb	March	April	May	June
Liters of fuel used by tractor	550	456	458	624	576	730

He must draw a histogram because time is continuous.

6. Pie Graphs

Pie graphs are graphs that represent the data as segments of a circle. The various data will take up a certain angle of the total angles in a circle (360º).

Example

In a community, an extension agent is collecting information about how many farmers have access to and apply improved technologies or packages on maize production. Some of the community members use only improved seed without fertilizer, some others apply fertilizer but not use improved seed, while others sow their own local seeds with line sowing but without fertilizer. She/he goes about asking questions to the community and arrives home with the following data:

Table1.3 shows how many farmers have access to and apply the package

Details	Improved seed	Fertilizer	Line sowing	All packages	Total
No of people	33	42	50	23	148

He now calculates the percentage and the segment of 360º that she will use to draw up the pie graph:

Calculation table 1.4

Details	Improved seed	Fertilizer	Line sowing	All packages	Total
No of people	33	42	50	23	148
% of total	33/148 x 100 $\approx$ 22,3%	42/148 x 100 $\approx$ 28,4%	50/148 x 100 $\approx$ 33,8%	23/148 x 100 $\approx$ 15,5%	100
Degree of 360^0	33/148 x 360º $\approx$ 80º	42/148 x 360º $\approx$ 102º	50/148 x 360º $\approx$ 122º	23/148 x 360º $\approx$ 56º	360

Now He/she can draw her Pie Graph: Draw your pie chart based on the above information.
If you measure the angles of the different segments, you will find that they are exactly as worked out in the calculation table. Check it. Pie charts are best used if there are six or less sets of data.

Storing data

➢ Production data sheets should be stored according to enterprise procedures.
➢ Production data can be downloaded or entered into a computer where required, using specified formats and applications.

Name--   Date----------------------------

Directions: Answer all the questions listed below.

1. List the methods and ways of data representing and/or presenting(15pts)

Note: **Satisfactory rating -15 points   Unsatisfactory - below 15points**

Name: _____   Date: _____

Short Answer Questions

1.

Information Sheet-2	Storing production data sheets

2.1. Collecting and organizing production data

What is production, data and information (knowledge)?

Production: The ultimate objective of all economic activity is the satisfaction of human wants, so any activity or process that satisfies a human desire either directly or indirectly, presently or in the future can be considered as production.

✓ is a process by which resources are transformed into products or services that are usable by consumer

Data -is any information collected as part of a research proposal and expressed as numbers. In practice, most measurements are classified into qualitative or quantitative data.

✓ Data refers to raw material such as facts and figures that could be collected by an information system.

Information- refers to analyzed data, often presented in a form that is specifically designed for a given decision-making task, and transmitted to/received by decision makers. It is the pattern people impose on the phenomena they are able to observe. Much of the information needed to solve farmers' problems with their decision making will come from research, although some will come from others farmers and from policy makers.

Example .information related to subsidies, price, forecasts, etc

Knowledge-refers to the subsequent absorption, assimilation, understanding and appreciation of that information.

2.2 Sources of information (Knowledge) –farmers use many different sources to obtain the knowledge and information they need to manage their farms well. These sources include;

- Others farmers' organizations and their staff members
- Government extension organizations
- Private companies selling inputs, offering credit and buying products
- Farm journals, radio .television and other mass media ,etc

2.3 Characteristics of Agricultural Information

1) **Relevance:** The information that a person uses must be relevant to the current problem at hand. If the information is not relevant it would not help to solve the problem at all.

2) **Completeness:** good Agricultural information is complete. This means that it provides intended users with all the information that is necessary to fulfill their information needs and requirements. Completeness also suggests that all necessary information is included in any report that the organization produces. The assumption is that there would be no error of omission in the information. If the information is not complete and only partial information is received, it may lead to wrong decisions being made as only half of an entirety of the information is known.

3) **Accuracy**: - The information must be accurate as inaccurate information would lead to many different major problems. It leads individuals to wrong decisions. Agricultural information should be accurate. This does not suggest that you must always state figures and facts down to the last penny or detail. What it means is that information should be accurate enough for its intended purpose (or user), without being unnecessarily detailed. Inaccurate information cannot provide a valid representation of reality and can limit the effectiveness or worth of decisions based on it.

4) **Timely (Current):-** The information must be current as a fact of yesterday may not be a fact of today. For example, the price of wheat per kilo today may not be the same with tomorrows. As the stock market is ever changing, current information is really a must. Since information has an objective, there are usually periods within which these objectives operate. Good information neither is produced too frequently nor is it compiled after it is needed most. For instance, information that reaches a decision-maker after the decision is of limited use in the context of the decision-making process.

5) **Economical**: - The information used must be of economical use to farmers, different organizations, companies that use them. If the information used is not economical it would result in users making losses. That is why economical information is important.

2.4 Information as an Aid to Decision Making

The process of decision making as comprising **four steps**: **intelligence, design, choice,** and **review.** The intelligence stage encompasses collection, classification, processing, and presentation of data relating to the organization and its environment. This is necessary to identify situations calling for decision. During the decision stage, the decision maker outlines alternative solutions, each of which involves a set of actions to be taken.

The data gathered during the intelligence stage are now used by statistical and other models to forecast possible outcomes for each alternative. Each alternative can also be examined for technological, behavioral, and economic feasibility. In the choice stage, the decision maker must select one of the alternatives that will best contribute to the goals of the organization. Past choices can be subjected to review during implementation and monitoring to enable the manager to learn from mistakes. Information plays an important role in all four stages of the decision process. Figure 1 .1 indicates the information requirement at each stage, along with the functions performed at each stage and the feedback loops between stages.

Figure .1 Role of information in the decision process
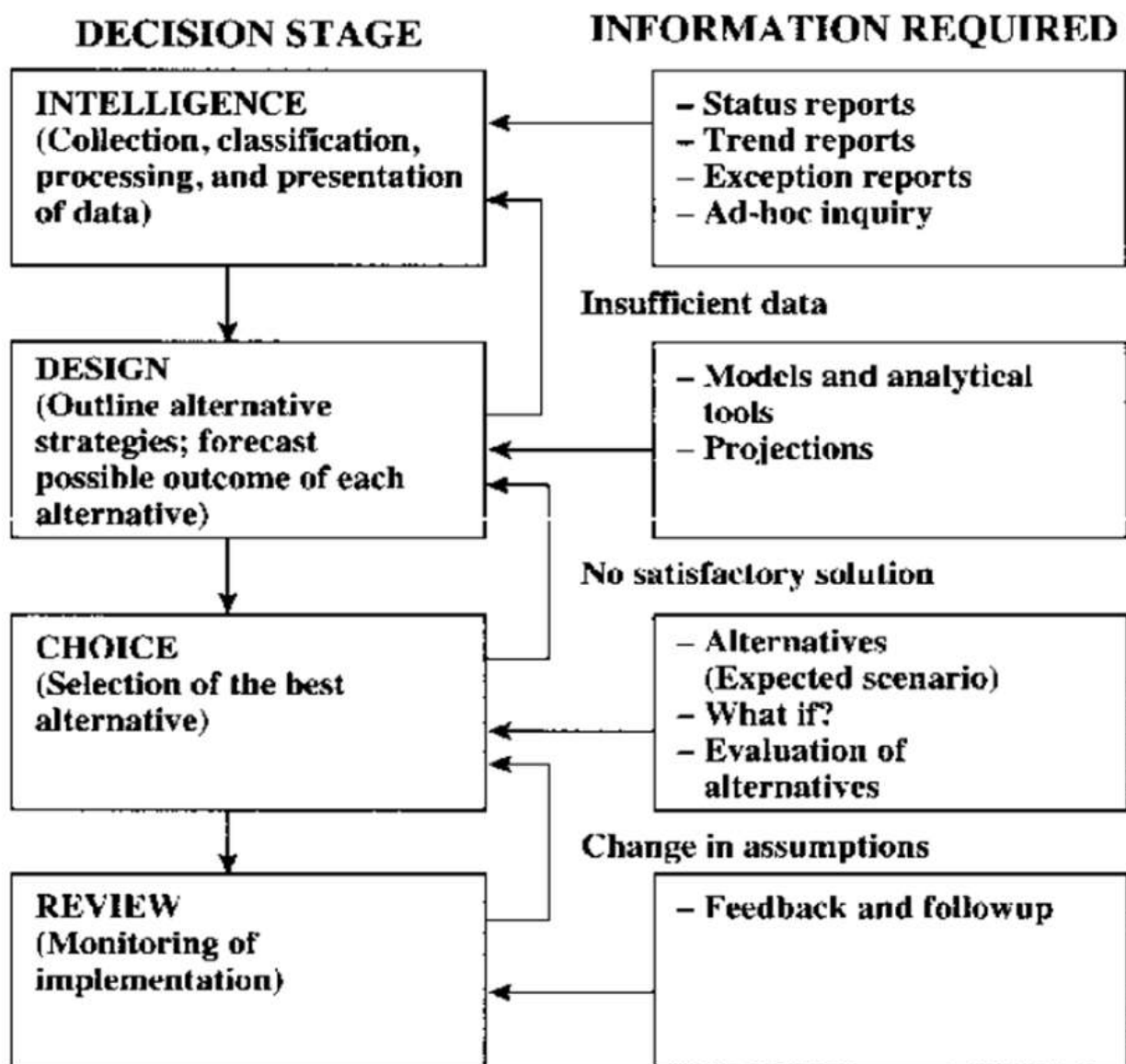
2.5 How to Organizing (collecting) information

Ideas expressed in paragraphs, letters, memos, or reports should be organized in some logical, efficient order. Collected data has to be organized in a suitable form to understand the information gathered (organization of data) This textbook presents two methods: **inductive and deductive**.

Here are **four** other possible plans plus additional information on the inductive and deductive methods of organizing.

1. Chronological. Information presented in time sequence, either forward or backward, is chronological. This organization pattern works well in explaining events over time such as monthly sales figures for the past year. Chronological ordering is also desirable to describe history or development, such as background leading to a personnel/management disagreement. Chronological sequencing of ideas is necessary to show time relationships. However, it is overused by individuals who sequence their writing to reflect their thinking about a problem. Whatever was thought about first is written about first. Such organization prevents flexibility in the writing process and ignores the techniques of emphasis. An important thought may be submerged in a pool of chronologically listed ideas.

2. Geographical/Spatial. If you were planning a vacation trip touring the Bale Zones, you might work out the trip in a geographical order. You could organize your travel around Agarfa in the Agarfa college, Ali town, Robe -Goba, and Dinsho National Park. Within a large business building, custodial services might be assigned according to location—first floor, second floor, and so forth. Another form of geographical organization is illustrated by the division of a business into sales by state, county, or city. Geographical sequencing of ideas is less usable than other methods because of its rigidity; moreover, relatively few topics lend themselves to such organization.

3. Value/Size. The logical order for some topics begins with the most valuable or the largest item first. E.g. A report on Entrepreneur, might discuss its largest-volume franchise first, followed in descending order by others. Realtors have found that listing their properties from the most expensive to the least expensive (or vice-versa) is helpful to buyers and sellers. Imagine how frustrating it would be to find properties in the same price range if they were listed chronologically.

4. Simple to Complex. For difficult, technical, or abstract topics, the best plan of organization is often from simple to complex. Good teachers, for example, begin with simple, basic concepts and proceed to more complex topics. More complex ideas can follow the foundation built on simple concepts. Whenever readers or listeners are unfamiliar with a subject or when the topic is theoretical, simple-to-complex organization is effective.

A. Inductive (indirect). This ways supplies examples, facts, or reasons first and then draws conclusions from them or **from specific to general**. Inductive organization is useful when readers are uninformed or when resistance or antagonism is expected. For example, a report written to convince management to fund an employee fitness program might begin with the advantages of a fitness program: improved job satisfaction, reduced absenteeism and turnover, improved productivity, and lower health care costs. After describing the benefits, the report writer could draw the conclusion that a company-sponsored fitness program is a wise investment. Starting with the main idea first risks the chance that readers opposed to the idea will read no further. Persuasive memos, letters, and reports often follow the indirect plan.

B. Deductive (direct). This organizational plan presents the main idea or conclusions and recommendations first. Examples, reasons, and clarification follow or **from general to specific**. Most business writing is deductive because this method presents information clearly and openly. Use this plan for routine messages, such as those that convey favorable or neutral information. For example, to inform students of campus parking regulations, a straightforward announcement should be made. But if students must be persuaded to pay an extra fee for parking in preferred locations, a letter describing the proposal might be written inductively with the Assessing the spatial distribution of crop production using a generalized cross-entropy approach . **Examples of Enterprise** requirements include; Quality assurance and/or procedures manuals**,** bio security requirements**,** animal welfare, procedures for updating records, OHS policies, procedures and programs, production plans systems, and processes, and defined resource parameters

2.2 Assessing information

While reported agricultural production statistics are reported on a geopolitical - often national - basis we often need to know the status of production or productivity within specific sub-regions, watersheds, or agro-ecological zones. Such re-aggregations are typically made

using expert judgments or simple area-weighting rules. We describe a new, entropy-based approach to making spatially disaggregated assessments of the distribution of crop production. Using this approach tabular crop production statistics are blended judiciously with an array of other secondary data to assess the production of specific crops within individual 'pixels' - typically 25 to 100 square kilometers in size.

The information utilized includes crop production statistics, farming system characteristics, satellite derived land cover data, biophysical crop suitability assessments, and population density.

Self-Check -2	Written Test

Directions: Answer all the questions listed below.

1. How we organize production data? **(5)**

Note: **Satisfactory rating -2. 5 points**   **Unsatisfactory - below 2.5 points**

Name: _____   Date: _____

Short Answer Questions

Information Sheet-3	Downloading or entering production data into a computer

3.1 Data requirements

Data Collection helps you and your team to assess the feasibility of your process. To do so, you must identify the **key quality characteristics** you will measure, how you will measure them, and what you will do with the data you collect. What exactly is a key quality characteristic? It is a characteristic of the product or service produced by a process that customers have determined is important to them. Key quality characteristics are such things as the speed of delivery of a service, the finish on a set of stainless steel shelves, the precision with which an electronic component is calibrated, or the effectiveness of an administrative response to a tasking by higher authority. Data Collection is nothing more than planning for and obtaining useful information on key quality characteristics produced by your process.

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.

Before you begin to collect data you need to plan how the data will be recorded

3.2. Methods of collecting data

Why do we need to collect data?

Every process improvement effort relies on data to provide a factual basis for making decisions. Data Collection enables a team **to formulate** and **test working assumptions** about a process and **develop information** that will lead to the improvement of the key quality characteristics of the product or service. Data Collection improves **your decision-making** by helping you focus on objective information about what is happening in the process, rather than subjective opinions. The purpose of collecting will determine which data have to **be analyzed, interpret and presented**.

3.3. Methods of collecting production data

The researcher should clearly identify and indicate on what specific key variables data are required, the method(s) of measurement and the unit of measurement. The selection of the variables should depend on what is to be done in the study. The researcher should also pay due attention to the nature of data (quantitative and /or qualitative, the kinds of data (secondary and /or primary data, the sources of data and how to collect the data. The choice of methods of data collection is largely based on the efficiency and accuracy with which the information will be collected and its practicability of the methods or techniques to the respondents.

3 .4. Nature of data

A .**Quantitative data;** when the variables being studied in a numerical form and it can be ranked or ordered. so, it said to be quantitative data. Example; height, body temperature, money, age weights, numbers of students in the class, distance from Addis to Agarfa college. **Quantitative data collection methods -**rely on random sampling and structured data collection instruments that fit diverse experiences into predetermined response categories. They produce results that are easy to summarize, compare, and generalize.

Quantitative research is concerned with testing hypotheses derived from theory and/or being able to estimate the size of a phenomenon of interest. Depending on the research question, participants may be randomly assigned to different treatments. If this is not feasible, the researcher may collect data on participant and situational characteristics in order to statistically control for their influence on the dependent, or outcome, variable. If the intent is to generalize from the research participants to a larger population, the researcher will employ probability sampling to select participants. Typical quantitative data gathering strategies include:

- Experiments/clinical trials.
- Observing and recording well-defined events (e.g., counting the number of patients waiting in emergency at specified times of the day).
- Obtaining relevant data from management information systems.

- Administer surveys with closed-ended questions (e.g., face-to face and telephone interviews, questionnaires etc).

I .Interviews

In Quantitative research (survey research); interviews are more structured than in Qualitative research. In a structured interview, the researcher asks a standard set of questions and nothing more and uses different types of Interviews. These are the followings:

a) Face -to -face interviews has a distinct advantage of enabling the researcher to establish rapport with potential participants and therefore gain their cooperation. These interviews yield highest response rates in survey research. They also allow the researcher to clarify ambiguous answers and when appropriate, seek follow-up information. Disadvantages include impractical when large samples are involved time consuming and expensive.

b) Telephone interviews are less time consuming and less expensive and the researcher has ready access to anyone on the planet that has a telephone. Disadvantages are that the response rate is not as high as the face-to- face interview as but considerably higher than the mailed questionnaire. The sample may be biased to the extent that people without phones are part of the population about whom the researcher wants to draw inferences.

c) Computer Assisted Personal Interviewing (CAPI): is a form of personal interviewing, but instead of completing a questionnaire, the interviewer brings along a laptop or hand-held computer to enter the information directly into the database. This method saves time involved in processing the data, as well as saving the interviewer from carrying around hundreds of questionnaires. However, this type of data collection method can be expensive to set up and requires that interviewers have computer and typing skills.

II. Questionnaires

a) **Paper-pencil-questionnaires** can be sent to a large number of people and saves the researcher time and money. People are more truthful while responding to the questionnaires regarding controversial issues in particular due to the fact that their responses are anonymous. But they also have drawbacks. Majority of the people who receive questionnaires don't return them and those who do might not be representative of the originally selected sample.

b) Web based questionnaires: A new and inevitably growing methodology is the use of **Internet b**ased research. This would mean receiving an e-mail on which you would click on an address that would take you to a secure web-site to fill in a questionnaire. This type of research is often quicker and less detailed. Some disadvantages of this method include the exclusion of people who do not have a computer or are unable to access a computer. Also the validity of such surveys is in question as people might be in a hurry to complete it and so might not give accurate responses.

Questionnaires often make use of Checklist and rating scales. These devices help simplify and quantify people's behaviors and attitudes. A **checklist** is a list of behaviors, characteristics, or other entities that researcher is looking for. Either the researcher or survey participant simply checks whether each item on the list is observed, present or true or vice versa. A rating scale is more useful when a behavior needs to be evaluated on a continuum

B. Qualitative data: When variables being studied in a non-numeric form it is called qualitative data.

Examples - color, religious preferences sex and, etc

Qualitative data collection methods play an important role in impact evaluation by providing information useful to understand the processes behind observed results and assess changes in people's perceptions of their well-being. Furthermore qualitative methods can be used to improve the quality of survey-based quantitative evaluations by helping generate evaluation hypothesis; strengthening the design of survey questionnaires and expanding or clarifying quantitative evaluation findings.

These methods are **characterized** by the following attributes:

- they tend to be **open-ended and** have **less structured protocols** (i.e., researchers may change the data collection strategy by adding, refining, or dropping techniques or informants)
- they rely more heavily on interactive interviews; respondents may be interviewed several times to follow up on a particular issue, clarify concepts or check the reliability of data
- they use **triangulation** to increase the credibility of their findings (i.e., researchers rely on multiple data collection methods to check the authenticity of their results)

- generally their findings **are not generalization** to any specific population, rather each case study produces a single piece of evidence that can be used to seek general patterns among different studies of the same issue

Regardless of the kinds of data involved, data collection in a qualitative study takes a great deal of time. The researcher needs to record any potentially useful data thoroughly, accurately, and systematically, using field notes, sketches, audiotapes, photographs and other suitable means. The data collection methods must observe the ethical principles of research. The qualitative methods most commonly used in evaluation can be classified in three broad categories:

1. In-depth interview: is a technique designed to elicit a vivid picture of the participant's perspective on the research topic. During in depth interviews the person being interviewed is considered the expert and the interviewer is considered as the student. Researchers engage with participants by posing questions in a neutral manner, listening attentively to participants' responses, and asking follow –up questions and probes based on those responses. In- depth interviews are usually conducting face- to face and involve one interviewer and one participant. In- depth interviews are useful for learning about the perspectives of individuals, as opposed to, for example, group norms of a community, for which focus groups are more appropriate. They are an effective qualitative method for getting people to talk about their personal feelings, opinions, and experiences. They are also an opportunity for us to gain insight into how people interpret and order the world

2. Observation methods: is a fundamental and highly important method in all qualitative inquiry. Observation entails the systemic nothing and recording of events, behaviors and artifacts (objects) in the social setting chosen for study. The observation record is frequently referred to as field notes-detailed, nonjudgmental, concrete descriptions of what has been observed

3. Document review -Documentation (to document) - is the term used in several different ways. Generally, it refers to the process of providing evidence. Documentation include

- written information for any read, projection or technical performing,
- data media of any format and for any reproduction,
- Other content.

Different ways of collecting evaluation data are useful for different purposes, and each has advantages and disadvantages. Various factors will influence your choice of a data collection method: the questions you want to investigate, resources available to you, your timeline, and more.

Name---   **Date**-----------------

Directions: Answer all the questions listed below.

1. List the methods of collecting production data (5pts)
2. Write down your explanation on nature of data (5pts)

Note: **Satisfactory rating 10 points**   **Unsatisfactory - below 10 points**

Name: _____   Date: _____

Short Answer Questions

List of Reference

1. *https://www.itchat.in/2018/02/20/compile-data-tool/*

2. *http://betterevaluation.org/plan/describe/collect_retrieve_data.*

3. *http://betterevaluation.org/plan/describe/manage_data.*

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