Basic Agricultural Production and Natural Resources Conservation Level-I

Based on Version-3 March 2018 OS.

Training Module –Learning Guide 08-11

Unit of Competence: Support Agricultural Crop work

Module Title: Supporting Agricultural Crop Work

TTLM Code: AGR BAN1 M03 TTLM 0919v1

October 2019

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This module includes the following Learning Guides

LG 08: Prepare materials, tools and equipment for agricultural crop work

LG Code:-AGR BAN1 M03 LO1-LG-08

LG 09: Undertake agricultural crop work as directed

LG Code:-AGR BAN1 M03 LO1-LG-09

LG 10: Handle materials and equipment

LG Code:-AGR BAN1 M03 LO1-LG-10

LG 08: Clean up on completion of cropping work

LG Code:-AGR BAN1 M03 LO1-LG-11

Instruction sheet	Learning Guide -08: Prepare materials, tools and equipment for agricultural crop work

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

- Prepare materials tools and equipment's for agricultural crop work

- Identifying materials, tools and equipment.
- Checking all materials, tools and equipment
- Handling and minimize damage when loading and unloading materials
- Select suitable personal protective equipment's (PPE)
- Providing OHS requirements
- Identifying OHS hazards

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 –

- Identifying materials, tools and equipment.
- Checking all materials, tools and equipment
- Handling and minimize damage when loading and unloading materials
- Select suitable personal protective equipment's (PPE)
- Providing OHS requirements
- Identifying OHS hazards

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described
3. Read the information written in the information "Sheet
4. Accomplish each "Self-check respectively.
5. If you earned a satisfactory evaluation from the "Self-check" proceed to the next or "Operation Sheet

6. Do the "LAP test"

Information Sheet-1	Identifying materials, tools and equipment.

The agricultural crop work is an activity that are ***determining the cropping activity*** either it could be in the ***field crops, horticultural crops or stimulant and spice crops***. The activities are

- land preparation
- fertilization
- irrigation
- raking
- weeding
- harvesting etc.

according to each cropping system, therefore you will provide support on these activities by preparing the land as your supervisor directs you as the enterprise standard or work place information.

Tools and equipment's for agricultural crop work includes materials used during land preparation, cultivation, fertilizer and pesticide application, irrigation and harvesting and post harvesting materials.

The implements which are used to perform agricultural work operations are called **agricultural implements**

Therefore you need to know these tools and equipment's by their name and should identify those tools and equipment's physically.

1.1 Identifying tools and equipment's

Tools and equipment's used during land preparation and cultivation

- Shovel
- Fork

- Spade

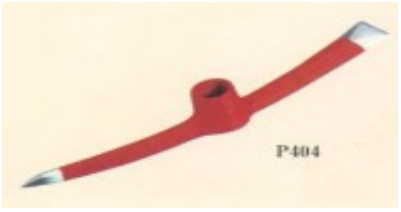
Spade used for:

- Making furrow and ridges
- Manage the flow of water in irrigated agriculture.

- Hoes

Hoe used for

- Soil preparation.
- Weed destruction.
- Mixing soil with fertilizer and compost



- pick axe
- Rakes

- Tractors, tractor mounted implements (disc plow, moldboard, disc harrow, leveler, riders)

Tools and equipment's used during fertilizer and pesticide application

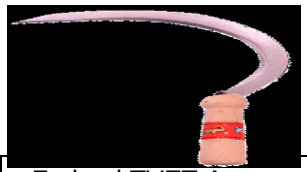
- Fertilizer applicator (similar to planter)
- Pesticide sprayers
    a. Tractor mounted sprayers
    b. Knapsack sprayers

Tools and equipment's used during irrigation

1. Diversion wires
2. Siphons
3. Sprinkler system
4. Drip system
5. Watering can

Tools and equipment's used during Harvesting and post harvesting

- basket
- bags
- sacks
- Sickles



- Machetes
- Combine harvester

Tools and equipments used during Harvesting and post harvesting

1. Combine harvester
2. Manual harvest
    a. gathering tools (basket, bags, sacks, etc)s
    b. Sickles
    c. Machetes
3. Refrigerators/ cold room

Self-Check 1	Written Test

Name: _____ Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

1. What is working under supervision? (3pts)
2. How much materials are there in your supervisors list of materials? (3pts)
3. How many materials did you find as faulty? (3 points)
4. List the tools and equipment's used during irrigation (3 points)

Note: **Satisfactory rating - 21 points** **Unsatisfactory - below 21 points**
You can ask you teacher for the copy of the correct answers.

Information Sheet-2	Checking all materials, tools and equipment

Check all the tools and equipment's before use, are all the materials functional and sufficient in number? Are all clean of any contaminants? Then check and report to your supervisor how much of the materials he provided in the list are functional and how much of them are faulty. Then are the functional tools and equipment's sufficient enough to the agricultural crop work with the available labor power. Then after reporting the faulty and functional materials your supervisor will guide you what to do if there is insufficiency of material for that particular agricultural crop work.

Self-Check 2	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. To whom do you make a report? (3pts)

2. What do you expect from your report to supervisor (3pts)

Note: **Satisfactory rating - 8 points** **Unsatisfactory - below 8 points**
You can ask you teacher for the copy of the correct answers.

Information Sheet-3	Handling and minimize damage when loading and unloading materials

Refresh your mind with the necessary cares you need to take while loading agricultural crop work materials and unloading from the transporting vehicles.

Loading and unloading of materials

To do the agricultural crop work we need to properly prepare the working materials in a working area for this purpose materials should be transported from where they are stored to the working site. In this regarded the required type and their sufficient number is already decided by the supervisor, hence these materials will be counted and will be loaded on a transporting vehicle and in the working site these materials will be unloaded.

Proper handling of the items or materials during loading and unloading

We already separated faulty materials not to be transported to working area, however while loading and unloading we should take the necessary care not to break, holing, etc. and not to make any of these materials faulty for the next time work, by properly handling materials we can prolong the time of service they can give and also minimize the cost of buying new materials in replacement to faulty once. Therefore the care we should take during loading and unloading includes the following dos and undos

- Do not through materials from ground on to the vehicle
- Do not through materials from vehicle on to ground
- Hold and place materials one by one rather than making more than one or two
- When placing materials on the vehicle place them in stable position
- Place materials on ground in stable position
- Place similar materials together on the vehicle while loading and on ground when unloading

Taking care of vehicle during loading and unloading

As already mentioned in the above topic, if materials will not be loaded properly, it is not only the materials that will be affected but also the vehicle as well. If we through materials from ground on vehicle we could break the glasses of the vehicle, we might hurt the loading surface and lead to fast depreciation of the vehicle. We might also create a problem when unloading materials improperly.

The first principle in loading and unloading materials is hold the material properly in both hands, keeping balance and safely placing the materials on vehicles or on ground, for these purpose at least two or more people are necessary one or more on the vehicle and one or more on ground.

Self-Check 3	Written Test

Name: _____ Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

1. What is proper handling of materials? (3 point)
2. What is loading materials? (3 point)
3. What is unloading of materials? (3 point)
4. Mention the necessary care that you should be made during loading and unloading of materials? (3 point)
5. How many people's are necessary in minimum to load and unload materials? (3 points)

Note: **Satisfactory rating - 13 points** **Unsatisfactory - below 13 points**
You can ask you teacher for the copy of the correct answers.

Information Sheet-4	Select suitable personal protective equipment's (PPE)

i. Selecting personal protective equipments

Selecting implies the process of ensuring that the personal protective equipment is directly related in protecting the person as related to the job performed. In the process one has to know the likely risks that might arise from the agricultural crop works. Therefore during loading and unloading the likely risks could be to be hit/ injured by the materials, mostly on hands and legs or foot, hence in addition to the care that we take during loading and unloading we need to protect our hands and legs. Therefore from among other protective equipments we select boots and gloves. In similar manner you need to identify the likely risks that might occur on your body or sense organs from specific agricultural crop works, then once you identify the risks it is necessary to select the necessary personal protective equipment that fit the body or the sense organ involved.

ii. Checking suitability of personal protective equipment

Checking involves many things such as the checking in faultiness of the personal protective equipment, checking the size, and checking the sufficiency in number of the materials for the available work force. If one of these is missing based on the level of the risk that occurs the expected risk could occur. Therefore don't proceed a job until the problems with the PPE will be solved. The size of PPE should be fit with your size, if the PPE is faulty it should be maintained or a new one should be provided, and if the number is not sufficient only people with the PPE should work the job

Self-Check 4	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. What is selecting PPE? (3pts)
2. What is the importance of selecting PPE(3pts)
3. How do you select the appropriate PPE (5pts)
4. What is checking the suitability of personal protective equipments (3pts)

Note: **Satisfactory rating - 24 points** **Unsatisfactory - below 24 points**
You can ask your teacher for the copy of the correct answers.

Information Sheet-5	Providing OHS requirements

Refresh your mind with OHS requirements needed during providing crop work support in the agricultural crop work area, therefore you will provided support during land preparation, seeding/sowing, fertilizer application, weeding, harvesting, baling, raking and loading unloading of products and materials, hence OHS requirements in this crop work supports will be discussed.

While providing the support there are possible risks that may endanger your health and safety, the dangers could be those which cause physical injury during land preparation, loading, unloading, mounting different plowing implements to tractors, etc. chemical injury or ingestion of poisonous chemicals during support in herbicide application for weeding and other pesticide applications for insect pest control. Therefore in giving this agricultural crop work support, there are jobs or activities that might harm your health and safety, hence you need to take care of those hazards by using the appropriate personal protective equipment, and by taking all the necessary care as it has been said “prevention is better than cure”; even sometimes the risk may not be cured letting the person to die. Great care should be taken when transferring chemicals from its main container to spraying equipments

The OHS requirement is therefore to take care of the likely risks that might occur during the work activity (occupation) hence to prevent these risks the worker should use the appropriate PPE and other cares.

OHS requirements to support this agricultural crop works

The possible risks that you need to take care of in supporting this agricultural crop work are during changing and adjusting mounting equipments on tractor in mechanized system, during preparation of the land manually, during loading and unloading of materials. Therefore personal protective equipments such as gloves, boots and sun screen lotion/ hat are very much required to undertake these agricultural crop work support.

Self-Check 5	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. What jobs are included in agricultural crop works PPE? (3pts)
2. Explain the type of work during crop work support (3pts)
3. What is the OHS requirement in crop work supports(5pts)

Note: **Satisfactory rating - 13 points** **Unsatisfactory - below 13 points**

Information Sheet-6	Identifying OHS hazards

Definition: Occupational health and safety is concerned with health and safety in its relation to work the working environment.

While providing the support there are possible risks that may endanger your health and safety, the dangers could be those which cause physical injury during land preparation, loading, unloading, mounting different plowing implements to tractors, etc. chemical injury or ingestion of poisonous chemicals during support in herbicide application for weeding and other pesticide applications for insect pest control. Therefore in giving this agricultural crop work support, there are jobs or activities that might harm your health and safety, hence you need to take care of those hazards by using the appropriate personal protective equipment, and by taking all the necessary care as it has been said ***"prevention is better than cure";*** even sometimes the risk may not be cured letting the person to die. Great care should be taken when transferring chemicals from its main container to spraying equipment's

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Identifying and reporting OHS hazards

Definition: Occupational health and safety is concerned with health and safety in its relation to work the working environment.

Aims of occupational health

Occupational health should aim at:-

1. The ***promotion and maintenance*** of the highest degree of physical, mental and social well being of workers in all occupation
2. The ***prevention*** amongst workers of departures from health caused by their working conditions.
3. The ***protection of workers*** in their employment from risks resulting from factors adverse to health.
4. The placing and maintenance of workers in an occupational environment adapted to his physiological and psychological capabilities and
5. To summarize the adaptation of worker to man and of each man to his job.

Work place hazards

The various work place environmental factors or stresses that may cause sickness, impaired health, or significant discomfort or inefficiency in works may be classified as chemical, physical, biological and ergonomic.

Chemical hazards

Chemical hazards include the followings;

A. Dusts Are substances consisting of solid particles that have been reduced to small size by some mechanical process. E.g. ***silica, coal, asbestos, lead cotton, wood, cement***. Dust from earth, hay and straw is not in itself very dangerous for the lungs because it is no siliceous as mine or quarry dust. It may, however, hamper breathing, may also hamper perspiration by clogging the pores of the skin, may be ***dangerous for the eyes***, and may carry other contaminants(fungi, bacteria, and so on) which cause illness. It is not always easy to provide protection against dusts. Very often workers will

not wear a dust masks because working in a mask is extremely uncomfortable, especially in hot climate.

B. Mist

Suspension in air of very small drops usually formed by mechanical means (atomization) or by condensation from the gaseous state.

E.g. acid mists

C. Gases Substance that will diffuse to evenly occupy the space in which it is enclosed. A gas does not appear in the solid state or liquid state at standard temperature and pressure.

E.g. ***chlorine, sulphur dioxide, ethylene oxide, ozone*** etc.

D. Fumes

Substances composed of solid particles formed by condensation from a gaseous state, these particles are microscopically small (odorous)

E.g. ***smoke***

E. vapors Gaseous form of a substance that is normally a liquid or solid.

E.g. ***alcohols***

Physical hazards

All work places encounter some agents of the physical environment which have potential to present health hazards at work.

The ***physical hazards*** can be:

1. Noise: absorbed through the ear:

Noise from farm tools and machinery can cause permanent hearing loss. Hearing loss may be temporary at first, but repeated exposure will lead to permanent damage.

The damage can occur gradually over a number of years and remain unnoticed until it is too late. Some noises, such as gunshots are so loud they can cause immediate permanent damage:

Once hearing is gone, it is gone forever and hearing aids are of little help. They can make speech lauder but they can't make it clearer.

Typical farm noises that can damage hearing include:

- Tractor

- Chainsaw etc

Protective equipment

- Where noise exposure cannot be reduced, hearing protection should be worn. e.g. ear muffs and ear plugs
- try on earmuffs before buying ,to ensure comfort and a sound –proof fit
- Clean and maintain re-usable hearing protectors, replace worn or damaged parts .keep protectors near the area of noisy activity.

2. Vibration

A particular source of danger to which man is exposed is the mechanical vibration of moving machines.

3. Heat

The ill effects of work in a hot climate are associated with the deficiency or exhaustion of the thermoregulatory mechanisms. In a ***hot climate***, beside the heat resulting from metabolic processes, the organism has to get rid of heat from the environment also.

Biological hazards

Some workers are subject to specific health hazards relating to the nature of their work with biological materials or from working in environments where micro-organisms may around .these hazards may be related to the existence of animals or plant materials or sometimes the treatment of sick person's .some biological hazards of work place include: ***bacteria, fungal, virus*** etc.

Self-Check 6	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. Define occupational health and safety?
2. State aims of occupational health and safety?
3. State work place hazards?
4. Discuss chemical hazards briefly?

Note: **Satisfactory rating - 13 points** **Unsatisfactory - below 13 points**
You can ask your teacher for the copy of the correct answers.

Operation Sheet-1	Identification of materials and separating faulty once

To identify all materials used in agricultural crop works and separate faulty once follow the following steps

1st **-** use a list of materials provided by your supervisor and then classify the materials according to their purpose as materials used during land preparation, cultivation or harvesting, etc.

Your supervisor will provide you with list of materials used in agricultural crop

2nd – know the name of the materials listed in your supervisors list

3rd – Go to agricultural crop work store or plant science department material store and identify all the materials physically one by one

4th – describe the use or purpose of each material

5th – check wear and tears of each material

6th – separate a materials which doesn't have best match with handle, broken, have hole on containers, not sharp/can be easily broken, or can't function relative to the purpose of the work, or any other unspecified reasons.

7th – count the number of faulty, functional or material that can be maintained very easily.

8th – finally report to your supervisor the categories of material based on their purpose, the total number of each category, the number of faulty materials and also; and also if the functional materials are sufficient in number for the intended agricultural crop work

LAP Test-1	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

1. You are required to perform any of the following:

    1.1 In store or field make sure that you can categorize tools and equipments of agricultural crop work according to their purpose.

    1.2 Inspect all the tools and equipments in each category and make sure that you can separate materials with any kind of fault and count their numbers

    1.3 After separating the faulty and functional materials make sure that you prepare a report about profile of the materials.

Operation Sheet-2	Loading/unloading and selecting suitable PPE

Before loading and unloading your materials you will be provided with agricultural crop work materials in the store, vehicle on which to load materials and suitable personal protective equipments.

- First go to the store and check that the different agricultural crop work materials are already there the vehicle provided and you are also ready to load materials by wearing the suitable personal protective equipments
- Then group yourself in pair of two person or more persons
- Open the back or the side of the carriage for easy loading if necessary, for loading the materials you should take care of the vehicles glasses or the vehicle could be carriage and a tractor.
- Let one person or one group be on the vehicle and the other group on ground
- Let the group on ground take materials from store and give it for his counterpart on the vehicle, note material should be taken one by one, or if suitable two by two or more if suitable
- Let the group or person on the vehicle receive the material from the person on the ground and place it on the vehicle. Note the materials should be placed orderly and safely, by note throwing the materials on the vehicle.
- Finally close the back side of the carriage and move to the site of agricultural crop work or unload the materials
- Use the same procedure above for unloading
- One group or person on the vehicle take materials orderly and from the top, and give it to the person on the ground
- Then the person on ground will take the materials to the store and place them orderly and safely without throwing them on the ground

LAP Test-2	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

1. You are required to perform any of the following:

1.4 You will be provided with the different materials of agricultural crop work, vehicle and personal protective equipments

1.5 Make sure that you wear the appropriate personal protective equipments

1.6 During the loading process, make sure you open one side of the carriage, when necessary and take care of the vehicle materials to be loaded and yourself

1.7 During unloading also take care of the materials, vehicle, yourself and make sure that you place the materials orderly in the store and in provided place.

1.8

Operation sheet-3	**Providing support based on OHS requirements**

To provide any one of the agricultural crop you should take care of your health and safety, because some of the risks could be incurable or acute poisoning could occur and kill the support provider.

Procedures in the daily routine work supports

1. First identify in what activity you are going to give a support

2. Then select the appropriate personal protective equipments that matches the activity
3. Use the protective tool or equipment before starting the agricultural support work
4. During maintaining and repairing of materials at least you should use a glove and in case of maintaining containers of dust or fluid chemicals you should use respirator
5. See the faults of the materials and maintain or repair the material accordingly
6. After preparing the materials
7. Follow the instructions provided by your supervisor and provide the support on the main activity
8. For example providing support on land preparation, fertilizer application or herbicide spraying, etc.
9. Finally identify the likely risks that could occur during individual crop work activity, and record it with its likely protective measures so that it can be use for the other non informed support provider.
10. Take always the necessary care before during providing any crop work support. The principle which says “safety first” works a lot.

LAP Test-3	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

1. You are required to perform any of the following:

1.1 You will be provided with the different materials of agricultural crop work, such as tools and equipments for land preparation, spraying, etc. and personal protective equipments

1.2 Then check how you work based on OHS requirements

1.3 Make sure that you wear the appropriate personal protective equipments

1.4 Check yourself you perfectly maintain and repair the desired material

1.5 How was your identification of risks in the different activities

1.6 Make sure you record the risks together with their likely solutions

Instruction-sheet	Learning Guide 09: Undertake Agricultural Crop Work as Directed

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

- **Undertake agricultural crop work as directed**

✓ Following Instructions, formulas and directions
✓ undertaking Crop work safely
✓ carryout interactions with other staff and customers
✓ observing handling and disposing materials based on enterprise policy and procedures
✓ Reporting problems or difficulties in completing work

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 –

✓ Following Instructions, formulas and directions
✓ undertaking Crop work safely
✓ carryout interactions with other staff and customers
✓ observing handling and disposing materials based on enterprise policy and procedures
✓ Reporting problems or difficulties in completing work

Learning Instructions:

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2. Follow the instructions described
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6. Do the "LAP test"

Information Sheet-1	Following Instructions, Steps and directions

You will be given instructions and directions by supervisor and clarification sought when necessary. Your supervisor will provide the necessary information about land preparation, planting, managing, picking, packing, loading and transporting techniques and storing. Your supervisor will also provide the necessary personal protective clothes help you to practice your work in safe manner. Safe work manner can be defined as practicing the without causing injury to the person, environment and yourself.

The agricultural crop work is an activity that are ***determining the cropping activity*** either it could be in the ***field crops, horticultural crops or stimulant and spice crops***.

Agricultural works should be conducted on appropriate instructions and direction
In agricultural crop work there are a serious of steps that must followed by the workers .The farmers must conduct that steps in order to get a good result.

The steps include:

1. ***Site selection***
2. ***Land preparation***
3. ***Seed sowing***
4. ***Harvesting***

Self-Check 1	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. Define Agricultural crop work? (3pts)
2. Mention some of the activities that are included in crop works (3pts)
3. What is following instruction and directions (3pts)

Note: **Satisfactory rating - 13 points** **Unsatisfactory - below 13 points**
You can ask your teacher for the copy of the correct answers.

Information Sheet-2	undertaking Crop work safely

Favorable agro climatic conditions

I. Environmental factors

It includes:-

- Temperature
- Relative humidity
- Solar radiation
- Wind velocity and direction
- Evaporation etc.

A. **solar Radiation**: solar energy is the source of energy for all physical processes taking place in the atmosphere. The intensity, quality, duration and direction of light affects plant growth and development.

Duration of light: This is a considerable importance for the farmer in selecting a crop variety. The length of the day has greater influences than light intensity.

Plants can be classified as.

A. short day plant: which develop and produce flowers normally when the photoperiod is less than a critical maximum (<12 hours of illumination)

B. Long day plants: which develop and produce flowers normally when the photoperiod is greater than a critical minimum (>12 hours of illumination).

C. Day- neutral plants: which are found to be unaffected by photoperiod.

❖ E.g. tomato, sunflower, cotton, etc.

Note: The relative length of day and night not only ***influence flowering*** but also affect the processes like ***initiation of leaves and tillers***.

Direction of light: shoots, roots and leaves show different orientation to the direction of light

B. Temperature: It is the degree of sensible ***heat or cold*** within the atmosphere. The instrument that measures temperature is called ***thermometer.***

1. It depends upon ***latitude, altitude, proximity to the sea, prevailing winds***, etc. it decreases in general from the equator towards the poles.
2. Every plant community has its own ***minimum, optimum and maximum temperatures*** known as their cardinal temperatures.
3. The temperature below the minimum and above the maximum limits is lethal to the crop growth and development.

In general, ***Influence of temperatures on crop*** plants are:

- ***seed germination***
- ***crop growth and development***
- ***pollination***
- ***seed setting & ripening***

C. Wind: is the movement of air in a horizontal direction over the surface of the earth.

- It affects plant growth and development mechanically and physiologically. For good wind ***pollinating plants*** bright sunny weather with gentle wind for ***good seed set*** required.

D. Rain fall: The ***amount and distribution*** of rainfall influences the crops considerably. Crops differ in their requirement of rainfall:

Excess rainfall is detrimental to crop growth as it affects soil fertility and productivity

- Excess amount of rainfall results in:-

- Flooding water logging
- Soil erosion
- Favors diseases and insect pests

Rainfall analysis helps in taking decisions on:-

- ***Time of planting***
- ***Irrigation scheduling***
- ***Time of harvesting***
- ***Leveling effect***

E. Relative humidity: It is defined of the ration between the actual quantity of water vapor in a given volume of air and the amount of water vapors could be held by that mass of air at the same temperature and under the same atmospheric pressure. It is expressed in percentage.

In general, RH has an influence on:

A. Leaf growth:

- Under high amount of relative humidity, turgor pressure will occur due to less transpiration.
- Moderately, ample relative humidity can ***favor leaf growth enlargement***.

B. Photosynthesis

- When relative humidity is low, transpiration increases ***causing H_20 deficient*** in the plant which causes partial or full closer of stomata and increase its resistance/blocking the energy of Co2. Thus photosynthesis is affected.

C. Pollination:

- When relative humidity is high ***pollen may not be dispersed*** from anther.

⊗ Moderately, ample air humidity is favorable to seed set in many crops–provided soil moisture supply is adequate.

D. Pests:

⌘ High relative humidity ***favors incidence of insect pests and diseases***.

E. Grain yield:

✪ Very high or low relative humidity is ***not conducive for grain yield***

Topography and soil factors

Topographic features or landscape of an area such as ***degree of slope and soil types*** has a marked effect on crop growth. Relatively level topography or plain has a distinct advantage in producing field crop by favoring mechanical field equipment. Thus, land selected for producing field crop ***should be flat or gentle slope***.

Land with steep slope will later ***leads to erosion problem***. In the absence of favorable slope, one can use the sloppy land for producing field crops, if and only if, the landscape allows construction of conservation structure to minimize the erosion, that would otherwise, leads to heavy erosion after eliminating the original vegetation of the land. Therefore, **it is highly recommended that do not produce field crops on land with a steepness of more than 15% without any effective method controlling soil erosion.**

Soil factors are another very important condition for producing field crops. Most of the crops perform well ***on deep, fertile, well drained soils with a moderate PH range.***

Method of Sowing and Spacing

Sowing Method

I. Broadcasting: seeds are spread uniformly over well-prepared land.

Suitable for: close-planted crops that do not require specific crop or plant geometry, e.g. Wheat, barley, teff, rice, oats, etc.

ii. Drilling: it means dropping the seeds in furrow lines in a continuous flow and covering them with soil.

Suitable for: wheat, barley, upland rice, sorghum, etc.

Advantages:

iii. Dibbling: it means sowing the seeds with the help of manual

lab our or a dibbler where in specific spacing and number of plants are maintained between the rows and within the rows.

Suitable for: the crops with bigger-size seeds and those needing wider

spacing and specific crop geometry for their canopy development, such as

maize, cotton, potato, sunflower, sugar-beet, etc.

Self-Check 2	Written Test

Name: _____ Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

1. List environmental factors that affect crop growth?
2. List the cause of excess amount of rain fall? (5pts).

----3.Which one of the following is day neutral plant?

A. Tomato B. Sun flower C. Cotton D. All E. None F. A & C.

----4. Which one of the following personnel protective equipment (PPE) to be used in chemical use and work place are?

A. Cover all B. Boots C. Gloves D. All

-----5. Which one of the following instruments is used to measure temperature?

A. Telescope B. Micro scope C. Thermo meter D. All E. None

Note: **Satisfactory rating - 18 points** **Unsatisfactory - below 18 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet-3	carryout interactions with other staff and customers

The interaction between the farmers, customers and staff members should be carried out in a positive manner

Self-Check 3	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. What are the mechanisms to create positive interaction with other staff and customers? (10pts)

Note: **Satisfactory rating - 20 points** **Unsatisfactory - below 20 points**
You can ask you teacher for the copy of the correct answers.

Information Sheet-4	observing handling and disposing materials based on enterprise policy and procedures

Crop works create much kind of wastes, among those wastes crop residues and waste pesticides and chemicals take the leading part. ***Crop residues*** have good advantage if we properly manage them where as waste pesticides and chemicals have Hazardous effect on environment and animals.

Crop residue

Crop residue is defined as the ***vegetative crop material left on a field after a crop is harvested***, pruned or processed. As much as possible farmers are encouraged to work crop residues back into the soil or compost them for use as a soil amendment. Recycling crop residues ***helps prevent erosion and preserve or improve soil quality.***

Advantage of crop residue

A) Maintenance of soil organic matter

Maintenance of soil organic a matter is important ***to nutrient supply and to soil physical properties that are critical to soil tilth, water infiltration and water holding capacity.*** Soil organic matter is maintained by decomposition of plant bio mass returned to the soil. Both above ground and below ground plant parts (shots, roots and root exudates)

B) Control water erosion and runoff

The value of maintaining ***ground cover to reduce water erosion and slow runoff*** is well known. Crop residue or a cover crop can provide the needed soil protection.

C) Control Wind erosion

Wind erosion is best controlled with ground cover of crop residue or a cover crop. Wind erosion often exceeds water erosion, especially during periods of extended drought. In

addition, blowing soil particles can damage young plants and reduce air quality, affect human and animal health and cause traffic accidents due to reduce visibility.

D) Soil water

Crop residue affects soil water by reducing evaporation, reducing runoff and enhancing infiltration.

Hazardous/ waste pesticides

Special waste is waste which has hazardous properties and is subject to additional controls to protect the environment and human health. Examples of special waste include: waste pesticides and chemicals which have hazardous properties; waste oils from farm machinery.

Handling and transporting materials, equipment and machinery

Transporting: - is taking of material, tools, equipments and machinery from place of storage to place of work and visversa.

Transporting can be:-

- Traditional method like ***push carts, animal drawn carts, on animals and persons***.
- Modern method like Lorries, tractors etc.

Before transporting of materials, tools, equipments and machineries, it important to check whether they are functional or not. Materials, tools, equipments and machineries should be transported to the site of work timely and properly. Transporting activity should take place according to the instruction of your supervisor.

Materials handling in agriculture is concerned with the movement and handling of materials and products in a systematic manner from point of origin to destination. Movement may be in any direction--horizontal, vertical or any combination of the two.

Handling of agricultural materials and products is important, not only because of the ***work involved, but because of its effect on costs, product quality and management.*** Materials handling costs account for as much as 25 percent or more of the total production cost for certain agricultural crops. These costs can be lowered with

efficient materials handling systems in which the components are integrated to provide a smooth flow of materials

Self-Check 4	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. List the advantage of crop residue? (10pts)
2. Explain the importance of soil organic matter? (10pts)

Note: **Satisfactory rating - 20 points** **Unsatisfactory - below 20 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet-5	Reporting problems or difficulties in completing work

Reporting is informing all information related to the work to a person who concerns about. It helps to the supervisor and other concerned persons' to know the standard of the work and at what level the work activities are found and also help to supply solution by concerned people if problems are there.

There are a number of problems occurred during crop work, of which some of them are as follows:

a. ***Faultiness*** of the tools and equipment's

b. ***Lack of materials*** for maintaining tools and equipment's

c. Lack of personal protective closes

d. Unsuitability of personal protective closes

e. Lack of materials, tools and equipment's during the work

f. ***Lack of agricultural inputs***,

g. Loss of tools and equipment's during the work

h. Damage to the vehicle etc

The problems occurred during undertaking crop work should be reported to the supervisor so that there will be solution for the coming work cycle.

Self-Check 5	**Written Test**

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. List the problems occurred during crop work? (10pts)
2. Explain the importance of reporting? (10pts)

Note: **Satisfactory rating - 20 points** **Unsatisfactory - below 20 points**

You can ask you teacher for the copy of the correct answers.

Instruction sheet	Learning Guide 10 Handle materials and equipment

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

- **Handle materials and equipment**
  - ✓ Store waste material
  - ✓ Handling and transport materials, equipment and machinery.
  - ✓ maintain clean and safe work site

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 –

- ✓ Store waste material
- ✓ Handling and transport materials, equipment and machinery.
- ✓ maintain clean and safe work site

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described
3. Read the information written in the information "Sheet
4. Accomplish each "Self-check respectively.
5. If you earned a satisfactory evaluation from the "Self-check" proceed to the next or "Operation Sheet
6. Do the "LAP test"

Information Sheet-1	storing waste materials

Refresh your mind with the following information

Waste material like plant debris, litters, broken components, plastics, metal, paper-based materials etc should be recycled or re-used, or disposed to appropriate site according to supervisor's instruction. Non-noxious weeds, crop wastes, liters are used for preparation of organic fertilizer preparation, crop residue can also serve as animal feed while other waste like broken pieces of metals should be stored in appropriate place and given to metal manufacturer company and plastics, paper can be buried. During storing waste material, it important to classify according to their category like wet solid waste, dry solid waste, liquid waste to make storing simple and store them according to supervisor's instruction.

Self-Check 1	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. Mention waste materials. (4 pts)
2. Why you categorize waste materials as liquid, wet solid, and dry solid?
3. Mention plant residue which are used to prepare organic fertilizer. (2 points)
4. What do we mean by recycling waste materials? (2 points)

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

You can ask your teacher for the copy of the correct answers.

Information Sheet-2	Handling and transporting materials, equipment and machinery

Handling materials, tools, equipments and machinery

Refresh your mind with safeties applied when using and storing materials, tools, equipment and machineries.

A good care should be taken of the materials, tools, equipments and machinery which would then have a long life (prolong the time of service), minimize the cost of buying new materials in replacement to faulty once. It is not wise to keep workers sitting idle at critical periods of the work because of shortage of materials.

Rules in handling materials, tools equipments and machineries are:-

- Check that tools, equipments and machines are functional before start of the work
- Check that machines/tractors are serviced
- Used all tools, equipments and machines for what they are designed or constructed.
- Clean the tools equipments and machines always before storing them away.
- Store them in a neat, dry place.
- Repair and maintain simple tools, equipments

Transporting materials, equipment and machinery

Transporting: - is taking of material, tools, equipments and machinery from place of storage to place of work and vis versa.

Transporting can be

- Traditional method like push carts, animal drawn carts, on animals and persons.
- Modern method like Lorries, tractors etc.

Before transporting of materials, tools, equipments and machineries, it important to check whether they are functional or not. This helps you to undertake horticultural production work without shortage of materials. Materials, tools, equipments and

machineries should be transported to the site of work timely and properly. Transporting activity should take place according to the instruction of your supervisor.

Self-Check 2	Written Test

Name: _____ Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

1. Mention rules in handling tools, equipments and machinery. (4 points)
2. What is the importance of handling materials in a good manner? (2 points)
3. Define transporting? (3 point)
4. Mention methods of transportation. (2 point)
5. Which transportation method is faster and save time? (3 point)

Note: **Satisfactory rating - 16 points** **Unsatisfactory - below 16 points**

You can ask you teacher for the copy of the correct answers.

Information Sheet-3	maintain clean and safe work site

A clean and organized work area is essential to any agricultural mechanics project. Knowing where to find tools, supplies and materials will save time and useful in maintaining the proper inventory of tools and materials. A work place area that is cluttered and disorganized will not only be unsafe, but will hinder the proper maintenance of tools and equipment. A disciplined approach to daily cleaning and organizing will save time and effort in the long run and help ensure that accidents are prevented.

Starting the gardening season off right requires a thorough check of your garden equipment. Ideally it should be ***cleaned and evaluated after each use*** but we all know that doesn't always happen. Rust, broken parts and dull blades are an inevitable part of using these helpful implements.

Lay a large tarp out in an open area and bring everything out where you can see it. Wash all the gardening tools completely and allow them to air dry before proceeding with the next step.

You will need the proper equipment to manage your garden tool collection. Keep on hand rags, machine oil, small spare parts and extension cords or battery chargers as necessary.

Once cleaned every tool should be sharpened. There are special sharpening items available for the purpose or you can use an all purpose file. Sharpen blades but also any digging implements. Shovel blades may be sharpened to increase the ease in which they plough through even hard pan clay. Sharpen at a 45 degree angle by running the file across the edge two or three times.

Self-Check 3	Written Test

Name: _____ Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some answers.

1. What is the advantage of cleaning and maintain work site safely? (5 pts.)

<u>Say true if the statement is correct if not false</u>

2. Safe work place is one method of minimizing work place hazards. 5 (pts.)

3. Shovel blades may be sharpened at a 45 degree angle to increase the ease in which they plough through even hard pan clay. (5 pts.)

Note: **Satisfactory rating – 20 points and above Unsatisfactory - below 20 points**

Instruction sheet	Learning Guide Clean up on completion of cropping work

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

- **Clean up on completion of cropping work**
  - ✓ Report Problems or difficulties in completing work to supervisor
  - ✓ recording and reporting materials, equipment and machinery condition after work
  - ✓ Reporting work outcomes

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 –

- ✓ Report Problems or difficulties in completing work to supervisor
- ✓ recording and reporting materials, equipment and machinery condition after work
- ✓ Reporting work outcomes

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described
3. Read the information written in the information "Sheet
4. Accomplish each "Self-check respectively.
5. If you earned a satisfactory evaluation from the "Self-check" proceed to the next or "Operation Sheet
6. Do the "LAP test"

Information Sheet-1	Reporting Problems or difficulties in completing work to supervisor

There are different problems that can be face during agricultural crop work activates. Like physical hazard ,chemical hazard ,biological hazards and psychological hazards. Before attempting any of the service or maintenance tasks, the machine or component should be cleaned. Dirt and dust particles are one of the major causes of wear and break down in any machine. The importance of keeping every particle of dirt and dust out of machinery components when carrying out servicing, maintenance or repairs cannot be over emphasized.Dirt or dist between any moving parts will cause that component to wear much quicker than it would otherwise. The best way to stop dust becoming a problem during service or maintenance is to remove it before any parts have removed or dismantled.

Cleaning methods will vary with the machine or part being maintained or repaired. Grease nipples simply need a wipe with a clean rag before using a grease gun to force grease in to the bearing to be lubricated. But it is vitally important to remove any dirt grease or dirt and dust from that grease nipple before connecting the grease gun, as any dust or dirt on the tip of the grease nipple could also be forced in to the bearing with the new grease, causing premature failure of that bearing.

Self-Check 1	Written Test

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given a calculator, lot data computation sheet, coordinates of the corner of the lot, you are required to perform the following tasks –

1. Write harmful effects of dirt and dust particles?

2. List the type of hazards that occurred in work place?

Information Sheet-2	recording and reporting materials, equipment and machinery condition after work

The materials, equipment's and machinery should be returned to store on completion of the work after they have been cleaned, checked the number. Any dirt (soil, and other) adhering with the tools and equipment's should remove before storage. Similar tools should be stored separately without mixing with other tools which help you to identify easily. During performing the work, some tools, equipment's and materials can be broken, detached the handle from the main part, so such damaged tools should be maintained if the problem is simple. The broken tools should be identified and store alone until maintained. When materials are broken highly and not be maintained by other experts, they should be disposed of according to supervisor's instruction

Self-Check 2	Written Test

Name: _____ Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

1. What do you do before returning if tools are broken during the work? (3 point)
2. What is the importance of cleaning materials before returning them? (3 point)

Note: **Satisfactory rating - 8 points** **Unsatisfactory – below 8 points**
You can ask you teacher for the copy of the correct answers.

Information Sheet-3	Report work outcomes

Refresh your mind with reporting works out comes on completion of agricultural crop work.

On completion of agricultural crop work workout comes like productivity, production, strengths of production, weaknesses of production, and problems of production should be reported to you supervisor according to instructions and formats given from the supervisor. The work outcomes can vary depending on objective; it can be fruit, seeds, leafy parts, stem parts, flowers, lawns, etc. Reporting work out come helps you to get feedback by your supervisor so that you can leave your weakness and encourage your strength. It also helps the supervisor to get full information about the production. The reporting format may vary but it can be as follows:

S. No.	Work outcomes	Productivity (kg/quintal)	Production (kg/quintal)	problems

How to Write a Good Report

General Guidelines

These are some general things you should know before you start writing. I will try to answer the questions of the purpose of report writing, and the overall approach as well.

Purpose of a report: writing to be read

A key thing to keep in mind right through your report writing process is that a report is *written to be read*, by someone else. This is the central goal of report-writing. A report which is written for the sake of being written has very little value.

Before you start writing your report, you need to have in mind the *intended audience*. In the narrowest of possibilities, your report is meant for reading by yourselves, and by your advisor/instructor, and perhaps by your evaluation committee. This has value, but only short-term. The next broader possibility is that your report is readable by your peers or your juniors down the line. This has greater value since someone else can continue on your work and improve it, or learn from your work. In the best case possibility, your report is of publishable quality. That is, readable and useful for the technical community in general.

Overall approach: top-down

Take a top-down approach to writing the report (also applies to problem solving in general). This can proceed in roughly three stages of continual refinement of details.

1. First write the section-level outline,
2. Then the subsection-level outline, and
3. Then a paragraph-level outline. The paragraph-level outline would more-or-less be like a presentation with bulleted points. It incorporates the flow of ideas.

Once you have the paragraph-level flow of ideas, you can easily convert that into a full report, by writing out the flow of ideas in full sentences.

While doing the paragraph-level outline, think also about (a) figures, (b) tables, and (c) graphs you will include as part of the report at various stages. You will find that many things can be better explained by using simple figures at appropriate places.

Another thing to nail-down while doing the paragraph-level outline is the terminology you will be using. For instance, names of various protocols/algorithms/steps in your solution. Or names/symbols for mathematical notation.

The overall approach also includes multiple stages of refinement, and taking feedback from others (peers/advisor/instructor). I will talk about these in more detail after talking about the overall report structure.

Structure of a report

The following should roughly be the structure of a report. Note that these are just *guidelines*, not *rules*. You have to use your intelligence in working out the details of your specific writing.

- **Title and abstract:** These are the most-read parts of a report. This is how you attract attention to your writing. The title should reflect what you have done and should bring out any eye-catching factor of your work, for good impact.

  The abstract should be short, generally within about 2 paragraphs (250 words or so total). The abstract should contain the essence of the report, based on which the reader decides whether to go ahead with reading the report or not. It can contain the following in varying amounts of detail as is appropriate: main motivation, main design point, essential difference from previous work, methodology, and some eye-catching results if any.

- **Introduction:** Most reports start with an introduction section. This section should answer the following questions (not necessarily in that order, but what is given below is a logical order). After title/abstract introduction and conclusions are the two mainly read parts of a report.

  -
    - What is the setting of the problem? This is, in other words, the *background*. In some cases, this may be implicit, and in some cases, merged with the motivation below.
    - What exactly is the problem you are trying to solve? This is the *problem statement*.

- Why is the problem important to solve? This is the *motivation*. In some cases, it may be implicit in the background, or the problem statement itself.
- Is the problem still unsolved? The constitutes the statement of *past/related work* crisply.
- Why is the problem difficult to solve? This is the statement of *challenges*. In some cases, it may be implicit in the problem statement.
- How have you solved the problem? Here you state the essence of your *approach*. This is of course expanded upon later, but it must be stated explicitly here.
- What are the conditions under which your solution is applicable? This is a statement of *assumptions*.
- What are the main results? You have to present the main *summary of the results* here.
- What is the summary of your contributions? This in some cases may be implicit in the rest of the introduction. Sometimes it helps to state contributions explicitly.
- How is the rest of the report organized? Here you include a paragraph on the *flow of ideas* in the rest of the report. For any report beyond 4-5 pages, this is a must.

The introduction is nothing but a shorter version of the rest of the report, and in many cases the rest of the report can also have the same flow. Think of the rest of the report as an expansion of some of the points in the introduction. Which of the above bullets are expanded into separate sections (perhaps even multiple sections) depends very much on the problem.

- **Background:** This is expanded upon into a separate section if there is sufficient background which the general reader must understand before knowing the details of your work. It is usual to state that "the reader who knows this background can skip this section" while writing this section.
- **Past/related work:** It is common to have this as a separate section, explaining why what you have done is something novel. Here, you must try to think of *dimensions of comparison* of your work with other work. For instance, you may

compare in terms of functionality, in terms of performance, and/or in terms of approach. Even within these, you may have multiple lines of comparison -- functionality-1, functionality-2, metric-1, metric-2, etc.

Although not mandatory, it is good presentation style to give the above comparison in terms of a *table*; where the rows are the various dimensions of comparison and the columns are various pieces of related work, with your own work being the first/last column. See the related work section of my PhD thesis for an example of such a table :-).

While in general you try to play up your work with respect to others, it is also good to identify points where your solution is not so good compared to others. If you state these explicitly, the reader will feel better about them, than if you do not state and the reader figures out the flaws in your work anyway :-).

Another point is with respect to the *placement* of related work. One possibility is to place it in the beginning of the report (after intro/background). Another is to place it in the end of the report (just before conclusions). This is a matter of judgment, and depends on the following aspect of your work. If there are lots of past work related very closely to your work, then it makes sense to state upfront as to what the difference in your approach is. On the other hand, if your work is substantially different from past work, then it is better to put the related work at the end. While this conveys a stronger message, it has the risk of the reader wondering all through the report as to how your work is different from some other specific related work.

- **Technical sections:** The main body of the report may be divided into multiple sections as the case may be. You may have different sections which delve into different aspects of the problem. The organization of the report here is problem specific. You may also have a separate section for statement of design methodology, or experimental methodology, or proving some lemmas in a theoretical paper.

The technical section is the most work-specific, and hence is the least described here. However, it makes sense to mention the following main points:

- *Outlines/flow:* For sections which may be huge, with many subsections, it is appropriate to have a rough outline of the section at the beginning of that section. Make sure that the flow is maintained as the reader goes from one section to another. There should be no abrupt jumps in ideas.
- *Use of figures:* The cliche "a picture is worth a thousand words" is appropriate here. Spend time thinking about pictures. Wherever necessary, explain all aspects of a figure (ideally, this should be easy), and do not leave the reader wondering as to what the connection between the figure and the text is.
- *Terminology:* Define each term/symbol before you use it, or right after its first use. Stick to a common terminology throughout the report.

- **Results:** This is part of the set of technical sections, and is usually a separate section for experimental/design papers. You have to answer the following questions in this section:
  - What aspects of your system or algorithm are you trying to evaluate? That is, what are the questions you will seek to answer through the evaluations?
  - Why are you trying to evaluate the above aspects?
  - What are the cases of comparison? If you have proposed an algorithm or a design, what do you compare it with?
  - What are the performance metrics? Why?
  - What are the parameters under study?
  - What is the experimental setup? Explain the choice of every parameter value (range) carefully.
  - What are the results?
  - Finally, why do the results look the way they do?

The results are usually presented as tables and graphs. In explaining tables and graphs, you have to explain them as completely as possible. Identify trends in the

data. Does the data prove what you want to establish? In what cases are the results explainable, and in what cases unexplainable if any?

While describing a table, you have to describe every row/column. And similarly while describing a graph, you have to describe the x/y axes. If necessary, you have to consider the use of log-axes.

If you are presenting a lot of results, it may be useful to summarize the main take-away points from all the data in a separate sub-section at the end (or sometimes even at the beginning) of the results section.

- **Future work:** This section in some cases is combined along with the "conclusions" section. Here you state aspects of the problem you have not considered and possibilities for further extensions.
- **Conclusions:** Readers usually read the title, abstract, introduction, and conclusions. In that sense, this section is quite important. You have to crisply state the main take-away points from your work. How has the reader become smarter, or how has the world become a better place because of your work?

Refinement

No report is perfect, and definitely not on the first version. Well written reports are those which have gone through multiple rounds of *refinement*. This refinement may be through self-reading and critical analysis, or more effectively through peer-feedback (or feedback from advisor/instructor).

Here are some things to remember:

- Start early, don't wait for the completion of your work in its entirety before starting to write.
- Each round of feedback takes about a week at least. And hence it is good to have a rough version at least a month in advance. Given that you may have run/rerun experiments/simulations (for design projects) after the first round of

feedback -- for a good quality report, it is good to have a rough version at least 2 months in advance.

Feedback should go through the following stages ideally: (a) you read it yourself fully once and revise it, (b) have your peers review it and give constructive feedback, and then (c) have your advisor/instructor read it

Self-Check-3	**Written Test**

Name: _____ Date: _____

Time started: _____ Time finished: _____

1. What is the need of reporting work outcomes? (4 points)
2. What are the possible work outcomes of agricultural crop work? (3 points)

Note: **Satisfactory rating - 6 points** **Unsatisfactory - below 6 points**
You can ask your teacher for the copy of the correct answers.

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