HORTICULTURE

Securing Farm Tools, Implements, Equipment, and Facilities

This instructional material was collaboratively developed and reviewed by educators from public and private schools, colleges, and or/universities. We encourage teachers and other education stakeholders to email their feedback, comments, and recommendations to the Department of Education at action@deped.gov.ph.

We value your feedback and recommendations.

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Table of Contents

Preparing Farm Tools, Implements, and Simple Equipment for Agricultural Farm Operation

QUARTER 4

Conducting Pre-agricultural Farm Operations
Topic: Securing Farm Tools, Implements, Simple Equipment, and Facilities

Courtesy: Jones Rural School, Jones, Isabela

Content Standards	Performance Standard
The learner demonstrates understanding in securing farm tools, implements, simple equipment, and facilities.	The learner independently secures farm tools, implements, simple equipment, and facilities according to approved practices.

Securing Farm Tools, Implements, Equipment, and Facilities

Introduction

This lesson deals with the safety of farm tools, implements, simple equipment, and farm facilities. It includes simple repair, installation of preventive structures, and storage.

Learning Competencies/Objectives

At the end of the quarter, the students are expected to:

1. Perform simple repair and modification of farm tools, implements and equipment
2. Install preventive structures in the farm
3. Maintain and store farm tools, implements, and simple equipment according to approved practices

Pre-Diagnostic Assessment:

Directions: Read the questions carefully and choose the letter of the correct answer. Write the answer in your quiz notebook.

1. Which of the following less describe a work shop?
   A. Provides an area for repairs
   B. Provides an area for storage
   C. Provides an area for lectures
   D. Provides an area where work can be carried out during inclement weather
2. Which of the following is **not** true about a work shop?
   A Presence of water supply for convenience and safety
   B. Presence of wide entrance only for large equipment
   C. Presence of storage cabinet for tools, supplies, and spare parts

D. Presence of fire extinguishers

3. What is the advantage of living windbreaks?

A. Protect people and livestock

B. Benefit soil and water conservation

C. Wildlife habitat for birds and little furry creatures

D. Take several years to develop, therefore, the economic benefit is not immediate

4. Hazardous materials should be stored in a safe place to prevent accidents. Which of the following is not a good practice in storing hazardous materials?

A. Flammable and poisonous materials should be stored in a separate room or cupboard

B. Hazardous products must be well-ventilated

C. Hazardous materials are kept in places which children cannot reach

D. Unconsumed or extra chemicals are stored in empty beverage bottles.

5. Which among the following practices of storing garden tools is **not** effective?

A. Remove any dirt or rust

B. Sharpen tools

C. Store tools on the ground

D. Spray metal parts with a good coat of lubricating oil

What to KNOW:

Activity 1

Below are some of the farm facilities in agri-crop production. Draw a square □ if the facilities are familiar to you and a triangle △ if it is not, opposite each column. Put a () if you know how to describe and (x) if you don't in the next column.

Farm Facility	Remarks			
	Familiar	Not familiar	Can describe	Can't describe
1. Storage barn				
2. Shop building				
3. Nursery				
4. Vicinity fence				
5. Greenhouse				

Reading Resources and Instructional Activities

Simple Repair and Modification of Tools and Implements

"Repair means to restore by replacing a part or putting together what is torn or broken" http://www.merriam-webster.com/dictionary/repair

A workshop provides a focal point at the farmstead for the repair and maintenance of machines, implements and structures. It also provides a place where tools can be stored in an orderly manner, a store for supplies and spare parts, and a shelter where work can be carried out during inclement weather. A facility of this type should be available on every farm. The size and design of a

workshop, however, should be commensurate with the size of the farm and the work to be done in the shop.

http://www.fao.org/docrep/s1250e/s1250e19.htm Retrieved

Important Features of a Safe and Efficient Workshop

1. Sufficient room for the largest machine that may need repair, including workspace around it. If the machine is large, truss roof construction may be needed to provide the required space without intermediate supports.

2. An entrance that is both wide enough and high enough for the largest equipment that the shop has been designed to accommodate. If the building is enclosed with either solid walls or wire netting, a second door is essential for safety in case of fire.

3. Some means of lifting and supporting heavy loads. When the roof span is 3m or less, a timber beam is often adequate. For larger spans or very heavy loads a truss will be required. Alternatively, a portable hoist can be used.

4. Electric lighting and electrical service for power tools.

5. A water supply for both convenience and safety.

6. One or more fire extinguishers of a type suitable for fuel fires. Two or three buckets of dry sand are a possible substitute or supplement for a fire extinguisher.

7. Storage cabinets for tools, supplies and spare parts. Sturdy doors can be locked for security and also provide space to hang tools and display small supplies for easy access.

8. .A heavy workbench attached to the wall or otherwise firmly supported. It should be 1 m high, up to 800mm deep and at least 3m long and equipped with a large vice. There must be sufficient clear space around it to maneuver work pieces and, if attached to a solid wall, ample window openings above it to provide light. http://www.fao.org/docrep/s1250e/s1250e19.htm

Simple garden tools are easy to repair. Spend a little time checking your garden tools for things to fix and recycle.

To replace a tool handle:

1. Clamp the tool blade in a bench vise.
2. Remove the handle from the hasp using a drill, hammer, or other tools as needed.
3. Insert the new handle into the hasp.
4. Tighten the handle in the hasp using fasteners. Use a screw and screwdriver to firmly attach the handle to the tool head.

To fix a leaky hose:

1. Cut through the hose on either side of the bad section using a sharp knife.
2. Attach male and female hose couplings to the cut ends, following the directions that come with the couplings. If the new hose fittings don't slide in easily, try softening the ends of the hose in hot water or lubricating them with soap or cooking oil.

To fix a broken tooth of a rake or fork:

Bring this to the shop and weld the broken portion of the tools. Do the same with the other tools and implements that need welding. For farm machineries that need repair, contact expert mechanics to do the job.

Installation of Preventive Structure

It has been observed that as we go on with our agricultural crop production work we often experience the occurrence of inclement weather. Before it is too late, we think of preventive measures we can take to safeguard our crops, tools, and other facilities. We should not only focus our attention on the occurrence of inclement weather, but we also have to consider other elements that may cause loss or damage to our property, such as stray animals, fire, and thieves.

The Philippines is particularly prone to natural disasters due to its geographical location and physical environment. The country experiences an average of 20 typhoons yearly, which trigger landslides, flashfloods, mudslides, widespread flooding, and cause destruction and damages to homes, community buildings, communications, infrastructure, and agriculture. To address these hazards and [to] slow [down] setting

climate change impacts, the integration of lemon trees in vegetable farms can be a suitable option for slope protection. Planting of trees such as *Calliandra* reduces weed growth, conserves soil moisture, and improves soil structure and fertility. It is planted in contour hedge-rows to decrease erosion on steep slopes, acts as windbreaks and as an understory component. http://teca.fao.org/read/7703#sthash.WmLjxFJP.dpuf

To safeguard our agricultural crops and farm facilities from damage cause by strong winds and typhoons, preventive structures should be installed beforehand. Examples of preventive structures are windbreaks.

"Windbreaks could be linear plantings of trees and shrubs designed to enhance crop production, protect people and livestock, and benefit soil and water conservation or buildings situated along vegetable areas or plantations". https://edis.ifas.ufl.edu/fr253 Retrieved

There are two types of windbreaks, living (natural) and non-living (artificial). Each type serves to reduce wind, but there are economic tradeoffs associated with each. This paper will focus on the advantages and disadvantages.

Living windbreaks are mostly composed of trees and shrubs, and in some cases tall grasses. Artificial windbreaks are vertical structures made from a variety of materials including metal and plastic cloth. One of the primary economic advantages of a living windbreak is that it is a cheap and cost-effective technology due to low establishment and maintenance costs. The primary economic disadvantage is that a living windbreak may take several years to develop; therefore, the economic benefit is not immediate. https://edis.ifas.ufl.edu/fr253 ,

Basic reasons why we plant windbreaks

- Reduce wind speed
- Windbreaks reduce heating and cooling cost to homes, and add value
- Provide a barrier from sound and site, smell
- Protect livestock

- Aesthetics -they look good
- Wildlife habitat -birds and little furry critters

  http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/txpmcot5584.pdf ,

Let's take a look at our facilities, such as the nursery shed, storage house, and farm shops. Examine their physical conditions (roofing, sidings, or floorings). Can they survive any disaster that may occur? Are the things inside safe? If not, what preventive structures should you undertake?

Below is a table indicating the facilities, physical conditions, possible calamities or disasters that may occur and the suggested preventive structures or contingency measures to be undertaken.

Physical conditions	**Facilities**	**Calamities/ Disaster**	**Suggested preventive/ contingency measure**
Weak posts	Nursery shed	Typhoon	Put braces
Leaking roofing	Storage barn	Heavy rains	Put water sealant (vulcaseal)
Unsafe windows and doors	Farm shop	Thieves/burglars	Put grills and heavy duty padlocks
		Fires	Provide fire hydrants call fire department
		Run off	Construct drainage canal
Dilapidated	Vicinity fence	Astray animal	Reconstruct fence

Prepare Farm Facilities and Equipment for Storage

After quite a long time, farming operations finally come to an end. At this time, we have to check the tools, implements, and equipment we used and prepare them for storage.

Machinery and implement storage

On many small-scale farms or schools machineries and implements are stored in a simple shed just to keep them. The few small-sized hand tools and implements used in farming can normally be stored in any multipurpose structure at the farmstead or backyard. The tools, implements, and equipment need only to be secured for their protection from theft and vandalism, and kept dry avoid deterioration of the metal and wooden parts. The tools will last longer if they are cleaned and working surfaces are greased prior to storage. The tools may be hung on rails or hooks on the wall or from the ceiling for order and convenience and to protect them from dampness penetrating an earth floor in the store.

Implements, such as plows, harrows and cultivators, are little damaged by rust when left outdoors. If they are properly cleaned prior to storage and metal surfaces, particularly all threaded parts used for adjustments, are greased, then a little rust is not likely to harm performance enough to justify the cost of a storage structure. A fenced compound can offer adequate protection against theft during storage. Although implements containing wooden parts are more susceptible to decay, those parts can usually be replaced at low cost.

Machinery and Equipment Storage Buildings

There are numerous precautions that should be observed when storing machinery on the farm. Precautions include:

- Buildings where machinery and power tools are stored should be located far enough away from structures that house livestock and hay in case of fire.
- Fuel storage tanks should preferably be located below the ground, and a minimum of 40 feet from the nearest structure. Fuel cannot be stored in the same structure as machinery or power tools.

- Electrical lines coming into the building should be high enough to allow equipment to pass underneath.
- Electrical systems in machine sheds should be sufficient for the power tools and equipment that will require the use of electric current.
- Electric outlets should be of the three-prong grounded type.
- Machinery storage buildings should not be used to store debris.
- Doors on machine sheds should be wide enough so machinery can safely pass through without getting caught. It should be easy to pull or slide open doors and close them freely in case of an emergency.
- Exits should be clearly marked.
- Doors should be lockable to keep out children and unwanted visitors.
- Floor surfaces should be level and smooth, free of bumps and protruding rocks.
- Equipment should be parked so there is enough space for a person to walk freely around it.
- Buildings should have adequate ventilation for the starting or running of an engine within the structure. (Note: engines should not be left running inside a building for a prolonged period of time unless the exhaust is being properly vented externally).
- All tools and accessory equipment should be kept picked up and stored in their proper place, e.g., air hoses, oil cans, spare tires, jacks.
- Keys should always be removed from all equipment or machinery to prevent children or unauthorized people from starting them.
- Do not allow non-employees inside the machine shed. Children should never be allowed to play around or inside the machine shed or on farm machinery itself. http://nasdonline.org/document/1049/d000844/farm-machinery-and-equipment-safety-part-i-recognizing.html

Fuel and chemical storage

Many materials that are used on farms fall into the category of "hazardous materials," since they are either highly flammable or poisonous. Other materials frequently used on farms, such as fertilizers and cement, also have special storage requirements, mainly because they are hydroscopic, i.e., they tend to pick up moisture from the atmosphere. http://www.fao.org/docrep/s1250e/s1250e19.htm

Storage of Hazardous Products

Generally speaking, accidents that happen among children are due to the carelessness of adults. Hazardous products are not kept in places where children could not reach them. Unconsumed chemicals are kept in bottles of beverages and not properly labeled.

Hazardous materials stored on farms normally include the following:

- Highly flammable materials, such as engine fuel and oil, such as petrol, diesel, kerosene and lubricating oils.
- Gases, such as butane, propane and acetylene. (Oxygen promotes the combustion of other materials and must be handled carefully.)
- Paints containing flammable solvents, cellulose thinner or alcohol.
- Poisonous materials such as herbicides, insecticides, rat poison and sheep and cattle dips.
- Acids and alkali such as detergents, cleaning liquids, lye and quicklime (CaO).
- Medicines, such as veterinary drugs and supplies. Some drugs may require refrigeration.
- Wood preservatives and corrosion inhibiting paints.

http://www.fao.org/docrep/s1250e/s1250e19.htm

To prevent accidents, precautions should be taken, especially in storing hazardous materials. Hazardous materials should always be stored in a separate location containing only those materials. If the quantities are larger, flammable and poisonous materials should be

stored in separate rooms. Ideally each type of material should have its own storage space, that is, its own shelf in a cupboard or a storage room, or its own room in a cooperative or merchant store. Any storage for hazardous products must be well ventilated so that explosive or toxic fumes cannot accumulate.

http://www.fao.org/docrep/s1250e/s1250e19.htm retrieved

We should take note that some chemicals are harmful to the skin; therefore, washing facilities should be available nearby for immediate use.

Storage of Fertilizers and Other Non-hazardous Materials

Some fertilizers are hydroscopic and easily pick up moisture from humid air or from the ground. This causes them to become lumpy and to deteriorate. Fertilizers and cement are normally sold in plastic - lined bags offering some degree of protection. They should be handled and stored so that the bags are not punctured or otherwise damaged. In addition, the storage conditions should be as dry as possible. Bags should be placed on a raised platform in the storage. This will allow ventilation and prevent ground moisture from penetrating from below. The pile should be protected from rain by a roof or some other type of watertight cover. Fertilizer can be very corrosive to metals and should not be stored close to machinery or tools.
http://www.fao.org/docrep/s1250e/s1250e19.htm retrieved

Greenhouses

A greenhouse is a structure using natural light within which optimum conditions may be achieved for the propagation and growing of agricultural crops, for plant research or for isolating plants from disease or insects.

Greenhouses should be located in an open areas with no shade from trees or buildings and with access to roads. The land should be nearly level and well drained. If possible, the site should be sheltered from excessive wind. However, normal air movement is essential for natural ventilation systems and to prevent locally stagnant conditions.

A good, clean water supply is of paramount importance.

Electricity will be required if ventilation is to be mechanized and if stationary machinery is to be used in the greenhouse.

http://www.fao.org/docrep/s1250e/s1250e19.htm retrieved

Regarding the preparation of garden tools for long storage, you can adopt some of these practical practices:

- Begin by gathering all hand tools and removing any dirt or rust with a wire brush, steel wool, or light sandpaper.
- Sharpen the tools using a file that is made specifically for this task. Remember to move the file in one direction only, and at a 45-degree angle Sand wooden handles with sandpaper and follow up with a coat of paste wax or linseed oil if necessary.
- Spray all metal parts with a good coat of lubricating oil. This will prevent rust when your tools are stored in your tool shed or garage.
- Store your tools in a high place above the ground and in a dry spot.
- Drain water hoses and hang them in the garage or in the workshop.
- Don't forget about the lawn mower. If you don't have the chance to use up the gas before storing it, add a gas stabilizer to the fuel tank to prevent corrosion.

By following these few basic preparatory steps, you can ensure that on the following year, you'll be working in your garden instead of working on your garden tools. With proper care of the farm tools, implements, and equipment, you can also save yourself from buying new ones to replace them.

What to PROCESS:

Activity 2

Conduct an interview on experienced crop producers in the locality on how they secure and store their farm facilities. Make sure you answer the following questions:

1. What tools, implements, and equipment do farmers have to store?
2. How do they secure and store their tools, implements, and simple equipment?
3. What preventive structures do these farmers have?

What to REFLECT and UNDERSTAND:

Activity 3

Visit the school nursery and greenhouse. Are these facilities secured?

Make a report of your findings and submit it to your teacher.

What to TRANSFER:

Activity 4

Visit the shop of the school and take note of whether the tools, implements, and equipment are properly arranged and stored. Check if the tools, implements, and equipment are prepared for long storage since the school year is about to end. Report your findings to your teacher.

Summative Assessment

Directions: Read the questions carefully and choose the letter of the correct answer. Write the answer in your quiz notebook.

1. Which of the following is **not** true of a work shop?
   A. Presence of water supply for convenience and safety
   B. Presence of wide entrance only for large equipment
   C. Presence of storage cabinet for tools, supplies, and spare parts
   D. Presence of fire extinguishers
2. What is the advantage of living windbreaks?
   A. Protects people and livestock
   B. Benefits soil and water conservation

C. Wildlife habitat for birds and little furry creatures

D. Takes several years to develop; therefore, the economic benefit is not immediate

3. Which of the following less describe a work shop?

A. Provides an area for repairs

B. Provides an area for storage

C. Provides an area for lectures

D. Provides an area where work can be carried out during inclement weather

4. Which among the following practices of storing garden tools is **not** effective?

A. Remove any dirt or rust

B. Sharpen tools

C. Store tools on the ground

D. Spray metal parts with a good coat of lubricating oil

5. Hazardous materials should be stored in a safe place to prevent accidents. Which among the following is not a good practice in storing hazardous materials?

A. Flammable and poisonous materials should be stored in a separate room or cupboard

B. Hazardous products must be well ventilated

C. Hazardous materials are kept in places which children cannot reach

D. Unconsumed or extra chemicals are stored in empty beverage bottle

Summary/Synthesis/Feedback

The availability of tools, implements, simple equipment, and facilities is one of the important factors to attain success in agricultural crop production. These materials are not easy to obtain because they are expensive. Relative to this, these materials should be handled with extra care to preserve their serviceability, effectiveness, and availability. These should be stored in safe places but before they are stored they must be cleaned, sharpened, or oiled ready for long storage.

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GLOSSARY

Business refers to any activity which entails the buying and selling of goods. The manufacturing of products or providing services to a market.

Capital refers to money invested in a business to generate income.

Competency is an ability to do something, especially measured against a standard.

Contingency means the state of preparedness for possible emergencies**.**

Disaster refers to a calamity, such as a flood, tornado, fire, plane crash, etc., that happens suddenly and causes damage to several properties

Entrepreneurs are those who initiate or finance business ideas. They are popularly known as businessmen.

Entrepreneurship refers to the business activity of an entrepreneur.

Equipment are powered-tool machineries used in farming

Environmental scanning refers to careful monitoring of the internal and external environment of an organization purposely done to detect early signs of opportunities and threats that may influence present and future plans of the business.

Facilities refer to something built designed or created to provide a service or fulfill a need

Farm implements are accessories pulled by animals or mounted to machineries to make the work easier

Goal is anything an entrepreneur wants to achieve.

Greenhouse is a structure in which seedlings are propagated before they are brought to the nursery shed. In most greenhouses, the environmental condition is controlled.

Hand tools are objects that are usually light and are used without the help of animals and machines

Industry is a commercialized, standardized, and organized economic activity connected with the production, manufacture, or construction of a particular product or range of products in which many people are involved.

Inclement weather means severe environmental conditions such, as typhoons and heavy rain.

Leadership is the capacity or ability to lead a group of people or an organization.

Lifestyle is way of living of individuals, families (households), and societies, which they manifest in coping with their physical, psychological, social, and economic environments on a day-to-day basis.

Maintenance is work performed regularly to keep a machine, building, or piece of equipment in good condition and in good working order.

Manual handling refers to any activity that requires a person to use force to push, hold, restrain, or carry an object.

Market refers to a group of people with economically important needs and demands. The market opens entrepreneurial or business opportunities to everyone.

Nursery is a light structure where seedlings are cared for before being planted. It also serves as a shed which provides shade for growers raising seedlings.

Need is anything required by someone in order to satisfy particular goals and objectives.

Objective is a specific result that a person or system aims to achieve within a time frame and with available resources.

Opportunities in SWOT analysis it is the exploitable set of circumstances with uncertain outcome, requiring commitment of resources and involving exposure to risk.

Personnel refer to people employed in an organization.

Prepare means to take the necessary action to put something into a state where it is fit for use for a particular event or purpose.

Production is the process of transforming inputs, such as raw materials, semi-finished goods, subassemblies and intangible inputs, namely, ideas, information, knowledge into goods or services.

Repair means to restore the good condition of something broken or damaged.

Shop building refers to a building where hand tools are stored and repaired.

Storage barn is a building where agricultural chemicals and other materials are stored.

Strengths in SWOT analysis, are the capital, knowledge, skill, or other advantages that a firm has or can acquire over its competitors in meeting the needs of its customers.

Sustainability of business is the ability to maintain or support business over the long term.

Threats in SWOT analysis are negative indications that can cause a risk or become a loss, expressed as an aggregate of risk, consequences of risk, and the likelihood of the occurrence of the event.

Weaknesses in SWOT analysis refer to any negative indications that increase the risk of a loss and failure.