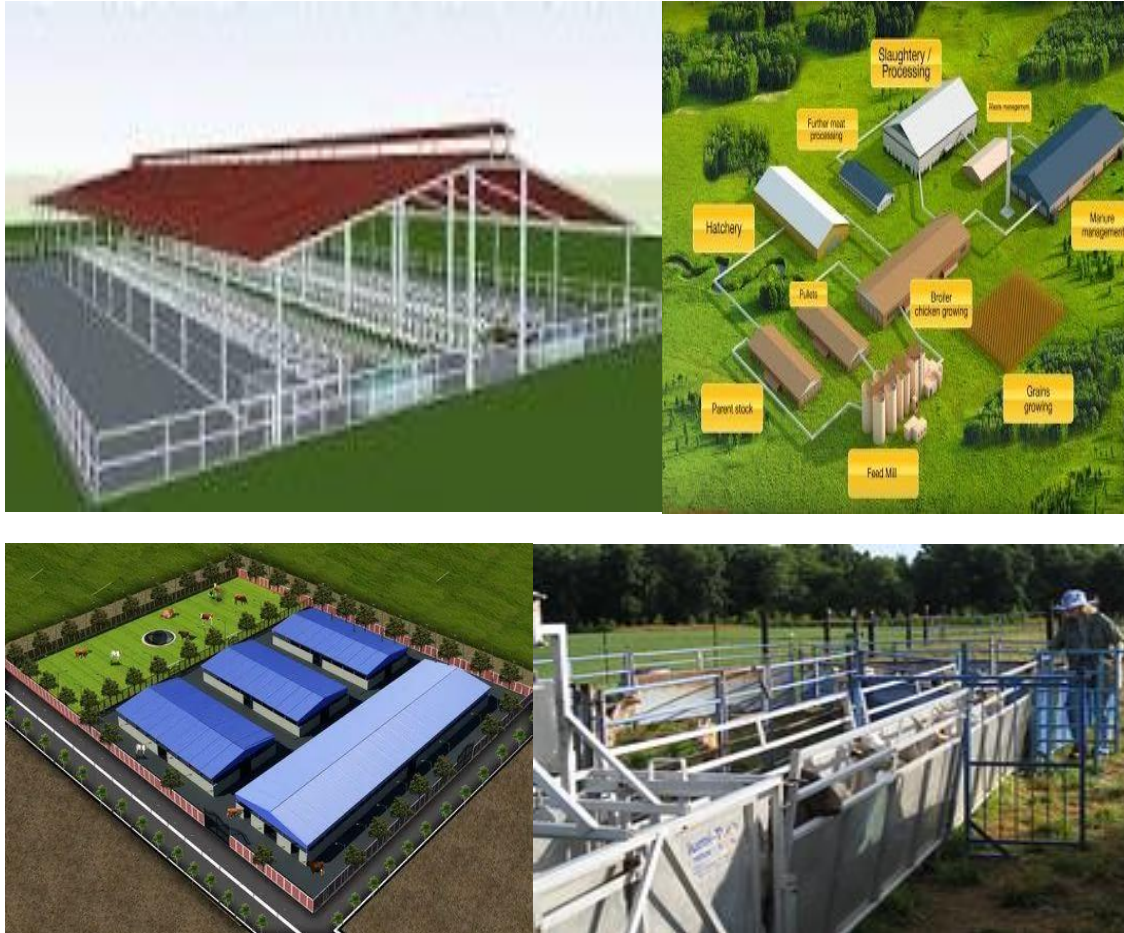


Animal Production

Level – III

**Based on March 2022, Version-4 Occupational
Standard**



**Module Title: Designing Livestock Farmstead Structure and
Facilities**

LG MODULE CODE: AGR ANP3 M10 05 23 LG (42-45)

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Introduction to the Module

This module covers the functions required to plan and design handling and/or accommodation facilities for livestock. It requires the application of skills and knowledge to identify and incorporate both livestock needs and enterprise objectives into an efficient and cost-effective design. Competency requires an awareness of industry development with respect to handling technologies are confined to restricted areas one can talk of housing

Terminology:

Livestock:- the domesticated animals raised in an agricultural setting to provide labor and produce diversified products for consumption such as meat, eggs, milk, fur, leather, and wool.

A farmstead is the center of all the farming activities. It includes the farm house, the place where livestock are housed and cared for and where crops are processed and stored.

A farmstead plan is a plan view scale drawing or drawings of existing and future farmstead facilities as planned by the owner(s) of the business. The drawings can be accompanied by a supporting document which explains the assumptions, calculations and time sequencing used in developing the drawings.

LG # 42

LO # 1- Undertake a site suitability analysis

Instruction sheet

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

- Inspecting location of new or existing site
- Recording physical elements and features of the site
- Identifying legal requirements and constraints
- Specifying surveys to be undertaken
- Assessing and determining site preparation

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

- Inspect location of new or existing site and physical elements
- Record features of the site for assessment of suitability.
- Identify legal requirements and constraints
- Specify surveys to be undertaken
- Assess and determine site preparation

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet - 1

1.1. Inspecting location of new or existing site

1.1.1. Introduction

Farmstead is the buildings and adjacent service areas of a farm.

Site is an area of land where livestock handling and accommodation facilities are being built or could be built. The new site to be selected for animal handling and accommodation facilities as well as the existing site should be suitable to the livestock.

1.1.2. Purpose of Site suitability analysis

Site suitability analysis allows you:

- To qualify, compare, and rank candidate sites based on how closely they adhere to criteria that you select and define.
- Contributes for successful livestock handling and or accommodation activities

Site selection or suitability analysis is a type of analysis used in GIS to determine the best place or site for something such as livestock farmstead structures and facilitates

1.1.3. Inspecting existing site

The most important points to consider when evaluating existing buildings and facilities for another use are location. If the location is suitable, a building can always be modified for an alternate use. A farmstead is satisfactory, if it is on a suitable site, if the individual buildings are properly designed for the functions they serve, and if their grouping is properly planned.

The site should be chosen carefully. Select the best location available for an enterprise with:-

- Sufficient space,
- Good drainage,
- Access to water and other utilities, and
- Proximity to related operations.

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Also consider view, access, neighbors or other commercial operations, and utilization of existing topography.

If the lack of a suitable site, inadequate land base, restrictive zoning, or any number of other factors, make the existing farmstead unattractive for long-range plans, it may be very advisable to relocate now, perhaps within the same farming community. Selecting the site for new facilities is an integral part of the farmstead planning process.

1.1.4. Recording physical elements

If you plan to improve or expand your farmstead, or build a new one from scratch, you have to consider a number of factors before you begin. Before the erection of livestock buildings and facilities the enterprise or the owner should consider the following physical elements and feature of the site.

- **Water Supply**

Water of good quality is essential to a farmstead. Analyze your needs, taking into account both present conditions and future requirements. The water source can be a pipe line, drilled well, dugout, dam or spring. If a dugout is required, it should be large and deep enough to allow for evaporation losses and facilitate effective algae and weed control. Dams and dugouts must be located where they will collect enough runoff to refill each spring. If an adequate supply of good water is not available, find another location.

- **Road Access**

Ready access to municipal roads is important. Don't locate the farmstead too far from a public road, or you'll have to build and maintain an all-weather private lane at your own expense. The house should be the first building seen (or approached) when entering the farmstead for both appearance and traffic control. Regardless of where the farmstead is situated, choose the site for the house first and locate all other buildings in relation to it. You might consider having two entrances to the farmstead, one to the house and another to the main activity area. Such an arrangement reduces traffic, dust and noise around the house, but uninvited visitors are more difficult to detect.

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- **Electricity access**

Electricity and gas are your main source of power. Plan installation carefully to ensure adequate supplies are available when and where you need them. If you are planning a new installation, an extension, or replacing an existing line, consider underground line placement including natural gas lines, on the surface; place an easily seen marker at each end, and at each bend or corner

- **Topography and drainage**

Is it suitable (flats) for crop production and cattle grazing or hilly for tree plantations. Topography or the relief features of the land, influences drainage, access, view and how you should build facilities. An effective farmstead must have adequate surface and subsurface drainage. Most slopes should be from 2 to 6%, steep enough to drain but not enough to cause excessive erosion. Feedlots must be sloped more steeply, at 4 to 8%.

- **Soil type**

Fertile soil should be spared for cultivation. Foundation soils as far as possible should not be too dehydrated or desiccated. Such a soil is susceptible to considerable swelling during rainy season and exhibit numerous cracks and fissures.

- **Exposure to the sun and protection from wind**

A dairy building should be located to a maximum exposure to the sun in the north and minimum exposure to the sun in the south and protection from prevailing strong wind currents whether hot or cold. Buildings should be placed so that direct sunlight can reach the platforms, gutters and mangers in the cattle shed.

- **Climatic Factors**

- ✓ **Temperature**

The over-riding environmental factor affecting the physiological functions of domestic animals is temperature. For most farm animals a mean daily temperature in the range 10 to 20°C is referred to as the "comfort zone".

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✓ **Humidity**

Too low humidity in the air will cause irritation of the mucous membranes, while too high humidity may promote growth of fungus infections. High humidity may also contribute to decay in structures. If possible keep the relative humidity in the range of 40 to 80%.

- **Surroundings**

Areas infested with wild animals and dacoits should be avoided. Narrow gates, high manger curbs, loose hinges, protruding nails, smooth finished floor in the areas where the cows move and other such hazards should be eliminated.

- **Marketing**

Livestock buildings should only be in those areas from where the owner can sell his products profitably and regularly. He should be in a position to satisfy the needs of the farm within no time and at reasonable price.

1.2. Identifying legal requirements and constraints on development process

1.2.1. Identifying legal requirements

Legal requirement is an obligation imposed on an organization, including those that are statutory or regulatory

You must consider your legal requirements when starting your business. If you do not follow legislative requirements and regulations, your business can face serious penalties. A range of legal requirements may affect your business.

1.2.2. Identifying Constraints

A constraint is a condition, agency or force that impedes progress towards an objective or goal. Constraints should be identified and described in as much detail as possible during the early stages of a project, so that awareness of them and their potential impact can be managed.

Type of constraints

There are a number of different types of constraint that can affect construction projects.

i) Design constraints

Design constraints could include (among many others):

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- Available technology, plant, materials, labor and so on.
- The budget
- Specific performance requirements site form, boundaries and conditions
- Neighboring properties
- Access
- Planning, and building regulations restrictions
- Completion date

ii) Technical constraints

Technical constraints generally refer to the processes involved in completing construction activities and are often based on the practicality of building methods and standards. For example, in constructing a foundation, the site must be leveled before excavation can take place; then form work can be placed as well as rebar before concrete is poured. Each task must be completed before the next can begin; therefore each task acts as a constraint on the next task.

iii) Economic constraints

Economic constraints relate to the project budget and the allocation of resources. If the budget is inadequate, or is allocated inappropriately, then it can have a negative impact on the success of the project in terms of quality, safety, functionality and performance.

iv) Management constraints

These can include particular shift patterns, overtime requirements, resource allocation, safety procedures, working practices, and so on.

v) Legal constraints

Legal constraints refer to the many regulations that the activities and the practices on construction project must conform to. These most commonly relate to employment law, safety requirements, planning and building regulations requirements, environmental requirements and so on.

Failure to conform to legal constraints can have a considerable negative impact on a project, both in terms of delay, financial penalties and possible criminal proceedings.

vi) Time constraints

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vii) Environmental constraints

Environmental constraints include limiting factors concerning geographical location, geographical features, air pollution, tree and wildlife preservation and so on. These can often overlap with legal constraints

1.2.3. Development process

Development is generally defined in planning legislation as meaning the carrying out of works on, in, over or under land, or the making of any material change in the use of land or buildings. Such works require planning permission unless they are exempted.

The Planning and Development Regulations outline the threshold sizes and the exemption conditions for farm buildings.

Most farmyard developments now require planning permission.

It should be noted that the exempted development clause does not apply in the following situations or instances regardless of scale:

- Areas to which a special amenity order relate
 - Areas the preservation of which are covered in the county development plan or draft plan.
These will include: Natural Heritage Areas (NHAs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and All Archaeology Sites, see Records of Monuments & Places (RMP)
 - Obstruction of a right of way
 - Fencing or enclosure of land open to or used by the public during the previous 10 years
- Exempted Development only applies to areas outside town and city council boundaries (rural areas) and it only applies to buildings and other structures to be used for the purpose of agriculture.

a. Exemption Thresholds

A schedule of the common farmyard structures that come under the exempted development categories are given in Table 1. Roofed structures for the housing of cattle, sheep, goats, donkeys, horses of all kinds, deer and rabbits are defined under Class 6. The

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next most important agricultural category is Class 8. This includes roofless cubicles. Local regulations may require that livestock production facilities be set back a certain distance from public areas, neighbors and surface water to reduce potential contamination and nuisance problems. Most of us are strongly influenced by social, cultural and community factors and will not likely look at site selection from a global perspective.

The exemption limits for the various categories are summarized in Table 2. The size limit for a new structure in Class 6 or Class 8 is 200 square meters whether or not this is arrived at by the extension of an existing structure. There is also an aggregate limit of 300 square meters where a structure in the same Class is within 100 meters (includes buildings in any other farm yard within 100m). This means that even if the proposed structure is less than 200m², but the aggregate (total) of all structures within the same class exceed the 300m² limit, then planning permission is needed.

An example of this is where a farmer wants to build a slatted cattle shed with a gross floor space of 120 square meters within 100 meters of another building in the same Class (say a sheep shed with a gross floor area of 220 square meters). Planning permission is required as the total floor area (340 meters) of the two Class 6 buildings exceeds 300 square meters.

Other Structures

Class 7 covers the housing of pigs and poultry. The exemption limits are 75 metres for individual structures and 100 metres on aggregate. These limits are such that all commercial operations are likely to require planning permission.

Class 9 covers dry stores, barns, sheds and glass-houses. The exemption limits are 300 square metres for individual structures and 900 square metres on aggregate.

Class 10 includes all weather lunging areas, exercise areas and gallops for horses. These are exempt from planning provided they are not situated within 10 meters of the public road, the entrance is not directly off the public road and a height of 2 meters is not exceeded. There is also a requirement that they are used for exercising and training only and not for the staging of public events.

b. Exemption Conditions

The exemptions outlined apply subject to the following conditions:

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- Exempted farm buildings may only be used for agriculture
- Structures must have adequate slurry/effluent storage for its size, use and location, and
- Local Authority requirements in this regard
- Distance from public a road must be at least 10 meters (measurement is taken from the ‘metalled edge’, that is where the grass margin meets the road)
- Height above ground level must not exceed 8 metres within 100 metres of any public road
- Distance from any house (other than own), school, church, hospital or public building must be at least 100 meters unless consent is obtained in writing from the owner or occupier or person in charge
- In general no unpainted metal sheeting shall be used for roofing or on the external finish of buildings

Table1. Schedule of Farm Structures in Exempted Development Classes

Class 6	Roofed animal housing (cattle, sheep, goats, donkeys, horses of all kinds, deer and rabbits) and the ancillary provision for effluent storage Housing for pigs & poultry
Class 7	Roofless cubicles, open loose yards, self-feed silos and silage areas
Class 8	structures for the making or storage of silage, feeding aprons, assembly yards and milking parlours
Class 9	Dry stores, barns etc.
Class 10	Lunging rings/exercise areas/ gallops for horse

Table2. Planning Exemption Limits for Farm Structures in Various Classes

Class 6	Under 200 square meters and 300 square meters on aggregate
Class 7	Under 75 square meters and 100 square meters on aggregate
Class 8	Under 200 square meters and 300 square meters on aggregate

Class 9	Under 300 square meters and 900 square meters on aggregate
Class 10	No size limit provided there are no public events and entrance is indirect

1.3. Specifying surveys to be undertaken and determining tolerances

Surveying may be defined as the science of determining the position, in three dimensions, of natural and man-made features on or beneath the surface of the Earth.

Site surveys are inspections of an area where work is proposed, to gather information for a design or an estimate to complete the initial tasks required for an outdoor activity. It can determine a precise location, access, best orientation for the site and the location of obstacles.

Type of surveys

There are specialized types of surveys that have some unique features, and those individuals in the surveying practice should be aware of these.

- *Topographic survey*—A topographic survey is a special type of survey used to establish ground elevation points for map contour generation.
- *Cadastral survey*—A cadastral survey, also known as a boundary survey, is used to establish property lines and boundary corners.
- *Hydrographic survey*—A hydrographic survey is a special type of survey that defines water boundaries such as ocean, lake, and reservoir shorelines, as well as depth. The hydrographic survey is a form of water topographic surveying.
- *Route survey*—A route survey is performed to define and help plan and construct roads, highways, pipelines, etc. In addition to the survey of linear features, route surveys generally include the estimation of earthwork quantities for construction purposes.
- *Construction survey*—A construction survey is performed to provide horizontal and vertical positions for construction projects like buildings and parking lots and to assist in construction quantity estimates.

Any livestock farm stead structure and handling facilities received according to farm plan is to meet the following requirements

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- An estimate in relation to numbers of livestock to be handled/accommodated,
- An assessment of the need for portability
- The types of livestock holding operations to be conducted.
- It may also include an assessment of hazards to health and safety associated with existing facilities for the purpose of eliminating hazards
- Standard Operating Procedures (SOPs),
- Industry standards, production schedules,
- Work notes and plans,
- Manufacturers specifications,
- Operators manuals,
- Enterprise policies and procedures (including waste disposal, recycling and re-use guidelines), and Manager’s oral or written instructions.

1.4. Assessing and determining site preparation requirements

Site preparation is a critical step in the building process of a structure. It is the creation of a “pad”, leveling the ground and packing the dirt tight to have a stable working surface. A professional excavator who has experience using the equipment needed to create a level surface Site preparation should be done 1-3 weeks before build time. This is because over time, environmental factors affect the site, causing the ground to unsettle, erode, and loosen so if you prep the site too soon, you might need to re-prepare it before building.

Site preparation requirements

i) Site clearing

Building site preparation will vary greatly depending on the size of the site, location, and the condition of the existing site. It is a large consideration for any builder. In construction, it is all about keeping costs down and staying on schedule. A good end result usually begins with a good clean start. Therefore, getting the site preparation done on time and on budget is vital to the profitable success of the rest of the project.

ii) Soil testing and drainage design

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Soil testing will need to be handled by a civil engineer. This is usually done to decide where the drainage system will go and how it will be designed into the piece of property.

iii) Site plan design

Pre-designed site plans can be purchased from companies/governmental institutions. It will cost to purchase detailed site plans for your new building. You can purchase ordering designed plans from private designer. There are many well thought out layouts for sale so this is a cost-effective option for many people.

iv) Clearing and excavating

It will cost to take down each tree you need to have cleared from the building site. You may get a discount for getting multiple trees taken down. The height of the trees and the difficulty of the job will also play a role in deciding the final price. This is one of those services where price is the most important factor.

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Self-check 1	Written test
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Directions: Answer all the questions listed below.

I. Choose the correct answer

- A condition, agency or force that impedes progress towards an objective or goal is-----
 - Development process
 - exemption
 - constraints
 - plan
- The science of determining the position, in three dimensions, of natural and man-made features on or beneath the surface of the Earth is-----
 - Surveying
 - site clearing
 - construction
 - soil test
- What are the constraints made in relation to regulation during farm planning?
 - Economic constraints
 - Legal constraints
 - Technical constraints
 - Environmental constraints

II. Answer the following accordingly

- List the physical elements to be consider in site analysis for livestock farm
- Define legal requirements and constraints?
- State the condition of Exemption in legal requirement for farm structure
- List down the site preparation requirements

Note: You can pass to the next LG if you answer all above question; if you are not satisfied, go back to Information sheet 1 and read then answer the question again.

Name..... ID..... Date.....

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Operation Sheet 1

1. Recording elements to analysis site establishing dairy farm

A. Materials and tools

- Paper
- Pencil
- Pen
- Camera
- Clinometer

Procedures:

1. Taking full information the area/site
2. Observing the site
3. Measuring the slope of the land
4. Listing critical element elements
5. Write all information about listed elements
6. Judge the collected information of elements

LAP Test	Practical demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 6 hours.

1. Record physical elements of the site for establishing dairy cow facilities

LG #43

LO #2- Prepare a brief layout

Instruction sheet 2

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

- Assessing Options to modify existing facilities
- Identifying OHS codes of practice
- Preparing Brief layout and undertaking consultation
- Identifying Livestock behavior and design interactions

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

- Assess Options to modify existing facilities
- Identify OHS codes of practice
- Prepare Brief layout and undertaking consultation
- Identify Livestock behavior and design interactions

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 2

2.1. Assessing options to modify existing facilities or establishing alternatives

2.1.1. Assessing existing facilities

To modify the existing livestock buildings and facilities the enterprise or industry should consider the following factors:-

- Number of animals in the enterprise
- Space requirements per head
- Kind of facilities
- Location of facilities
- Environmental requirements
- Feed storage and handling methods
- Amount of land needed
- Amount of money and labor that is available
- Opportunity for expansion of the enterprise
- Coordination of new facilities with the existing facilities

2.1.2. Establish alternative facilities

The design process for a new building should take a series of steps that address the:

- Needs of the farm business – now and in the future
- Requirements of the cattle to be housed
- Available space on the farm
- Finances to fund it

The same process should be applied when renovating existing buildings. First assess their current state and functionality, considering whether:

- They provide a competent facility that is safe and easy to work in

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- They reduce business performance through poor animal health and lost productivity
- The building could be improved to the benefit of the livestock, staff and business

2.1.3. Environmental considerations in livestock accommodation/building design

There are many different building designs but in all cases the accommodation must control three key environmental parameters:

- Air speed
- Moisture
- Fresh air

Air speed (draughts)

Air speed within a building is critically linked to animal health and welfare. Air movement is essential to bring fresh air into the building and remove moisture, heat, and gases, although too much air movement is counter-productive

Temperature is often considered to be a key environmental factor, but this is only so in severe cold weather ($<0^{\circ}\text{C}$), or for young stock less than four weeks old.

More importantly are the negative impacts of increased air speed or high moisture levels combined with cold temperatures.

Moisture

Moisture is produced by all livestock in their breath, urine, faeces and sweat. The aim of good building design is to prevent any build-up of moisture by ensuring competent drainage and manure management, and effective ventilation that works in all weather conditions.

Excess moisture:

- Increases the risk of bacteria and virus survival
- Increases the risk of dirty water transmitting infection
- Increases the requirement for bedding
- Reduces ambient temperatures

Damp buildings generally feel cold. However, in warm or hot weather, dampness can be used beneficially to cool down livestock and buildings.

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- **Fresh air**

Fresh air is a primary requirement for maximizing health and productivity. Fresh air facilitates the removal of heat, moisture, dusts, gases and micro-organisms from the building.

It also has a further vital role. Fresh air is very effective at killing pathogens, killing many bacteria and viruses 10–20 times faster than a mix of half fresh and half stale air.

A crucial design aim for existing and new buildings is to deliver clean, fresh air to as many parts of a livestock building as possible, but to do so without exposing stock to excessive wind speed.

A lack of fresh air is sometimes indicated by an increase in airborne ammonia concentrations which can be smelled when entering the building. Elevated ammonia concentrations come from the mixing of feces and urine. Poor drainage and/or damp bedding can also contribute to the problem.

2.1.5. Welfare requirements

Welfare is the physical and mental well-being of an animal and can be influenced by the building in which it is kept.

Building design, construction and maintenance should all address the five freedoms that have come to define the ability of a system to provide good welfare.

The five freedoms are:

- I. Freedom from hunger and thirst – by ready access to fresh water and a healthy diet
- II. Freedom from discomfort – providing an appropriate environment that includes shelter and a comfortable resting area
- III. Freedom from pain, injury and disease – by prevention or rapid diagnosis and treatment
- IV. Freedom to express normal behavior – by providing sufficient space, facilities and company of the animals' own kind

2.2. Identifying and incorporating OHS codes of practice

According to WHO occupational safety and health can be defined as a multidisciplinary activity aiming at:

- Protection and promotion of the health of workers by eliminating occupational factors and conditions hazardous to health and safety at work
- Enhancement of physical, mental and social well-being of workers and support for the development and maintenance of their working capacity, as well as professional and social development at work
- Development and promotion of sustainable work environments and work organizations

Poor facilities and equipment can cause injuries to animals and the handler. Prior to construction or renovation of a livestock facility, considerable planning should be done. Yards and sheds should be strong enough and of a size to match the class of livestock handled

- Good yard design will assist the flow of animals
- Keep facilities in good repair and free from protruding rails, bolts, wire etc.
- When animals need restraining, use approved restraining devices
- Try to maintain yards in non-slippery condition
- Animals move easier from dark to light areas
- All restraining equipment should be checked regularly for wear or damage
- Portable handling equipment should be securely anchored

2.3. Preparing Brief layout and undertaking consultation

Farmstead layout is the plan form of the farmstead-the way the buildings are arranged and associated with the farm house, tracks and yards or it is in principle attribute which describes the overall character of the farmstead.

Layout is essential to increase the profit, decrease the production cost, and to increase the efficiency of operations in the farm.

2.3.1. Principles of farm layout

- **Need for planning**

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Farmers, if they expect to operate at a maximum profit and compete for their share must have their farm, buildings, and equipment arranged and designed for the highest possible operating efficiency

- **Planning is needed to reduce labor costs**

In many enterprises, such as dairying arrangement of their farm results in efficient use and maximum return from labor.

- **The first step in farm planning is choosing the system of farming**

Farming practices associate with the system of the farmers chooses will largely determine the farm and farmstead layout. For example, the arrangement of the farmstead and the design of the buildings would be quite different on a dairy farm than on a farm where crops are the main enterprise

- **Efficient space utilization**

An ideal layout should utilize the available space in an effective way.

- **Flexibility**

Manufacturing operations are dynamic in nature. There is continuous innovation in types of products manufactured as well as in equipment, techniques and processes of production. Therefore, the layout should be designed in such a way that the layout is flexible enough to adapt to changes.

- **Economy in handling**

The layout should facilitate economies in handling materials, work in progress and finished stock. Handling should be reduced by the optimal use of trucks, lifts and conveyors etc.

- **Minimum movement**

The layout should be designed that there is minimum movement of men/women and machines

- **Ensuring coordination**

A good layout would be able to coordinate all operations. The layout should be designed considering the inter-relationships between various equipment, departments and personnel. It is therefore important that while planning the layout the complete picture of the organization is considered.

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- **Visibility**

Work should be arranged in such a way that there is no problem in supervision, coordination and control. Raw materials, work in progress and finished goods should have specific storage points and must be visible at all times.

- **Reduced discomfort**

The layout should be designed in a way that there is minimum discomfort to the workers. It should provide for proper lighting, ventilation and reduced the impact of heat, noise, vibration, dust, fumes, odors etc.

- **Adherence to statutory regulations**

The layout should adhere to the regulations of the factories Act with regard to health, safety and welfare of employees.

- **Preservation of materials and equipment**

The layout should contain safeguards against fire, moisture, theft and general deterioration of equipment and materials. There should be adequate and safe storage locations. There should be provision for storing inflammable materials separately and in a safe manner.

2.3.3. Specification of farm layout

Farm layout should specify the following information

- Floor space requirements of various livestock
- Size of the farm
- Climatic conditions and topography of the land
- Drawing tools
- Budget allocation

All the elements of construction must be worked out in detail to ensure the building protects the animals inside while delivering the desired outputs. Consider:

- Length, width and height to the eaves
- Roof slope/pitch. A higher pitch will ventilate more efficiently than a lower pitch, and provide greater protection from solar gain (heating caused by the sun)
- Wall heights at animal height

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- Ventilation outlet and inlet areas. It is critical to get these right to prevent diseases such as pneumonia, to which housed cattle are particularly susceptible
- Roof cladding materials - Wall cladding materials
- Appropriate floor slopes and drainage

The following points should be considered before planning and designing animal houses-

1. It should be of attractive appearance
2. It should minimize labour cost
3. Efficiency of the operation should be increased
4. It should have resale value

2.3.4. Units of farm layout:

In general the livestock farm buildings can be grouped into five major categories:

- a) Farm houses or homestead
- b) Farm buildings or farmstead
- c) Farm store
- d) Isolation shed
- e) Quarantine shed

2.3.5. Dairy cattle farm layout

In general, a medium- or large-scale dairy farm lay out has the following building unit

1. Resting area for cows:
 - Paved shade; or
 - Peep bedding in an open sided barn; or
 - Free stalls in an open-sided barn.
2. Exercise yard (paved or unpaved)
3. Paved feed area:
 - Fence-line feed trough (shaded or unshaded); or
 - Self-feeding from a silage clamp.
4. Milking Centre:

- Milking shed or parlor; and
 - Collecting yard (part of the exercise yard); and
 - Dairy, including milk store; and
 - Bull pen with a service stall.
5. Calving pen(s) or maternity pen.
7. Calf accommodation.
8. Young stock accommodation (yard with paved shade and feed area).
9. Bulk feed store (hay and silage).
10. Concentrate feed stock

Table 2.1: Length and width of dairy farm building units

TYPE OF DAIRY FARM BUILDINGS, THEIR LENGTH AND WIDTH IN METRES			
<i>Types of building of dairy farm</i>	<i>Length (m)</i>	<i>Width (m)</i>	<i>Number</i>
A. House of cattle			
1. Cattle Shed (face to face)	31	10	1
2. Cattle Shed (tail to tail)	31	11.5	1
3. Shed for suckling calves	2	1.25	75
4. Shed for young female calves	4	2	8
5. Shed for young male calves	4	2	4
6. Shed for dry cows	3	2	20
7. Shed for bullocks	3	2	10
8. Bull Shed	4	4	2
9. Calving Pen	3	3	6
10. Isolation Room	4	3	5
11. Water Trough	12	5	—
B. Other Farm Buildings			
1. Milk Recording Room	3.25	4	1
2. Ration Room	3.25	4	1
3. Godown (a) for fodder	3.1	6.75	1
(b) Concentrate	3.1	6.75	1
4. Implement Shed	6.75	3.25	1



5. Chaffing Shed	6.75	5.0	1
6. Silo Pit and Tower	6.0H	4.25 Dia	2
7. Compost Pit	5	4	
8. Veterinary Dispensary	16	8	1
9. Office	6.75	5	1
10. Servant Quarter	4	4	1
11. Manager's Quarter	16	10	1
C. Dairy Buildings			
1. Milk Receiving Room	4	3	1
2. Milk Room	3.25	3.25	1
3. Washing and Sterilization Room	3.25	3.25	1
4. Boiler and Engine Room	4	3	1
5. Cold Storage	4	3.25	1
6. Pasteurizer and Bottle Filling Room	8	5	1
7. Butter Making Room	6.5	5	1
8. Dairy Office	10	5	1
9. Dairy Store	4	3	1
10. Tubewell	3.5	3	1

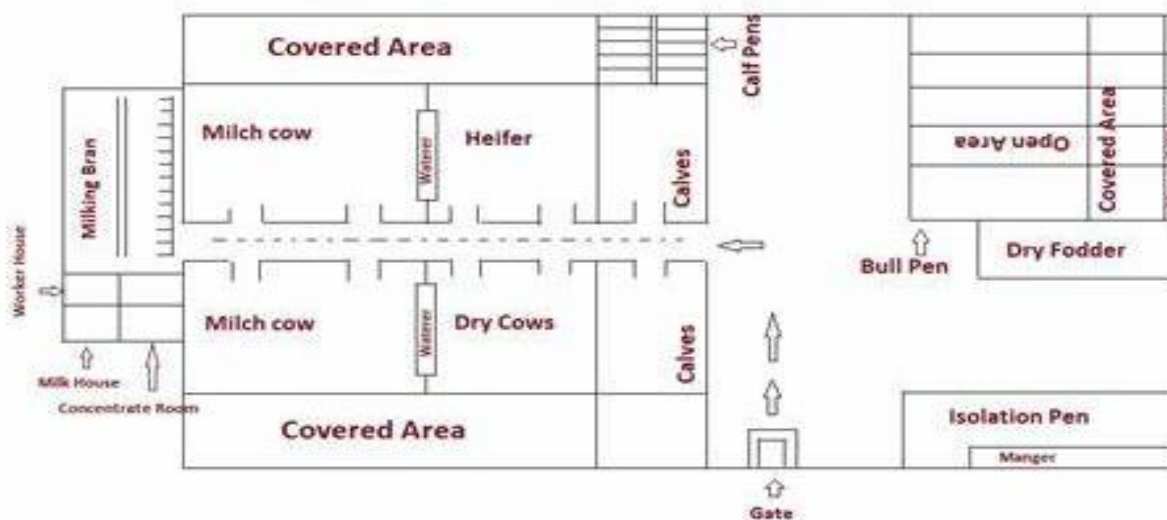


Diagram-2.1. Schematic draw dairy farm Lay out

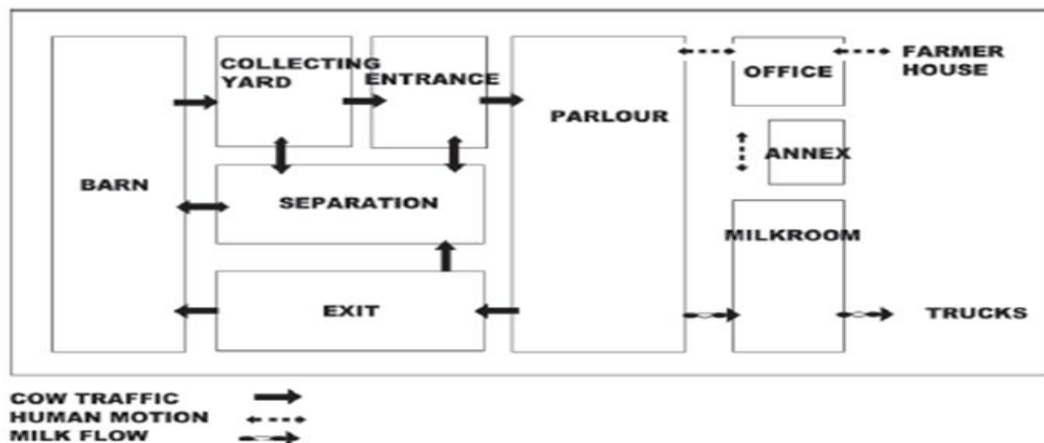


Diagram- 2.2. Schematic draw of milking House

2.3.6. Sheep and goat farm lay out

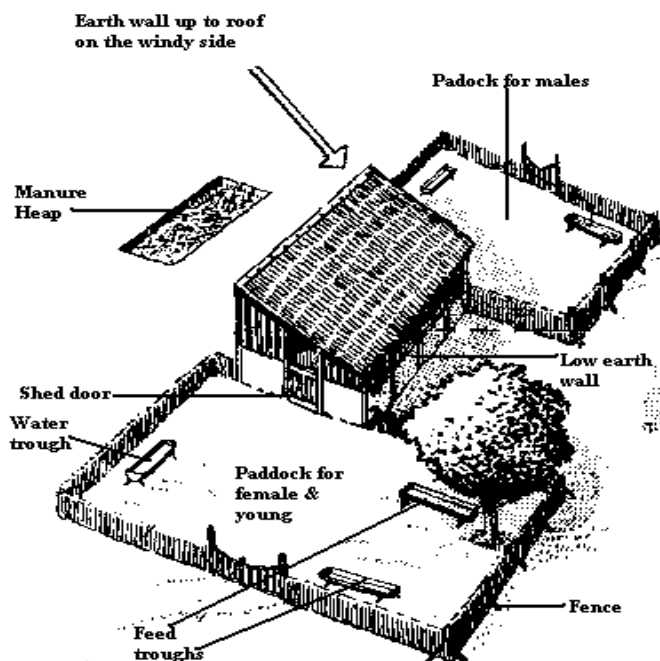


Figure2.1. Well-designed simple set up of a sheep farm Figure 2.2. Raised commercial house for Shoa

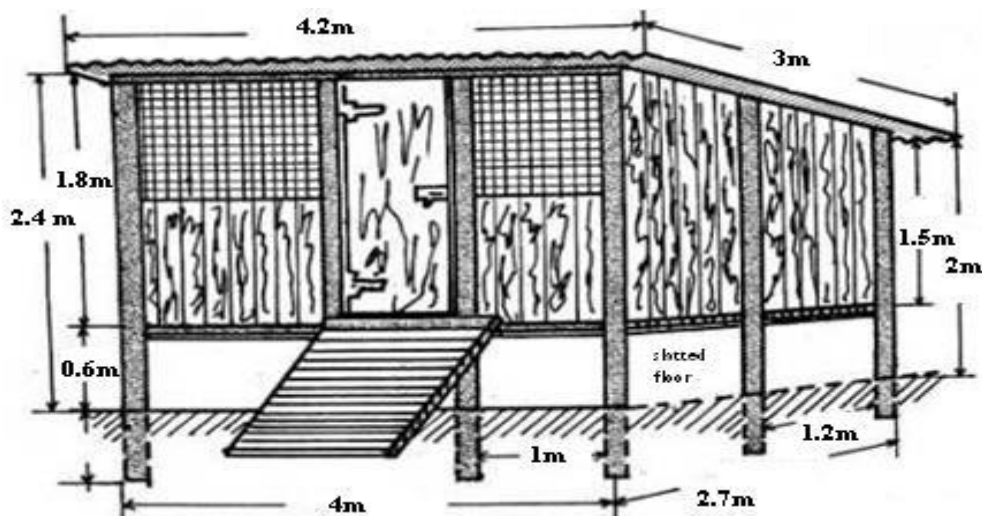


Figure- 2.3. House design for Small scale farmers

Modern Sheep and goat farm should include building units in design

- Lamb or kid shed
- Weaner shed (3 months)
- Young stock shed (6 months -1 year)
- Ewe or Doe shed
- Ram or buck shed
- Shearing shed
- Storehouse for wool
- Lambing or kidding shed
- Dipping tank
- Milking shed
- Feed go down for Concentrate feed and dry fodder
- Store house for milk
- Shepherd house (grazers)
- Isolation shed.

2.3.7. Poultry Farm lay out

Design of poultry housing must consider production and environmental aspects such as wind, heat and cold, predator risk and also their impact on production. Farm lay out and chickens' houses are designed according to farm objectives and standards

• Principles to be observer for layout:

- ✓ Layout should not allow visitors (for office works) and outside vehicles to come in contact with birds.
- ✓ Administrative block and feed mill unit should be kept away from sheds on farm.

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- ✓ The younger birds should be kept away from disturbances due to movements of outsiders.
 - ✓ For which brooder and grower houses are preferably.
 - ✓ Located at far end of site, away from administrative block and mill unit.
 - ✓ Should be necessarily placed on the upwind flow side to avoid cross-infection from adults to youngers through air
 - ✓ Feed mill is generally attached to medium and large size poultry farms and preferably placed near gate.
 - ✓ Diagrammatic sketch of poultry house showing orientation (East-west direction)
- **Type of poultry houses**
 - ✓ Open Houses
 - ✓ Open Front Houses
 - ✓ Curtain Houses
 - ✓ Closed Houses
 - ✓ Deep Pit House
 - ✓ High Rise Houses

The type of house you want to construct must consider:

- ✓ Topography of the area
- ✓ Climate
- ✓ Service
- ✓ cost

The house consist:- foundation, floor, wall and roof.

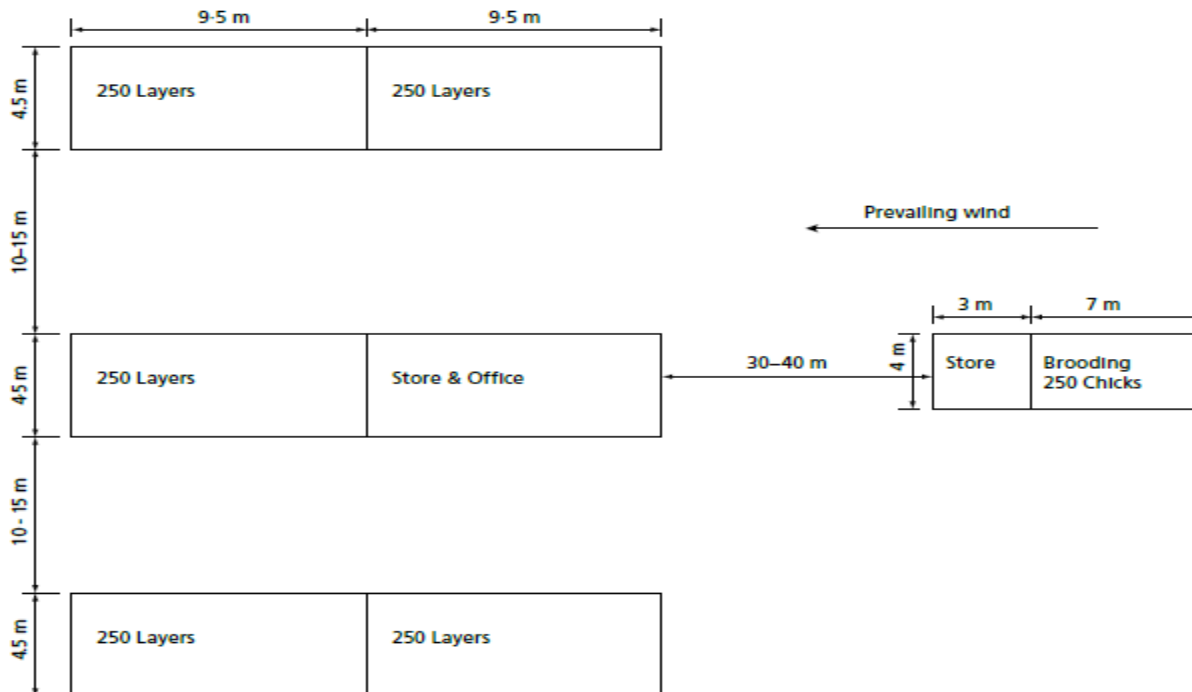


Figure 2.4. Layout of buildings for 1 000 layers and brooder house for replacements

2.4. Identifying Livestock behavior and design interactions

Identifying the behavior of livestock will facilitate handling, reduce stress, and improve both handler safety and animal welfare. Large animals can seriously injure handlers and/or themselves if they become excited or agitated. Reducing stress on animals has been demonstrated to improve productivity. Recent studies have shown the adverse effects of stress on animals. Restraint, electric prods and other handling stresses lowered conception rates. Transportation and restraint stress reduced the immunity in cattle and pigs. The stress imposed by transit had a greater detrimental effect on the animal's physiology than the stress of feed and water deprivation for the same length of time.

The purpose of this lesson is to provide practical livestock handling information. It will cover various factors which affect stress levels in livestock

Vision and Livestock motion

Livestock have wide angle vision. Cattle and pigs have a visual field in excess of 300 degrees. In sheep, the visual field ranges from 191 to 306 degrees, depending on the amount of wool on the head.

Loading ramps and handling chutes should have solid side walls to prevent animals from seeing distractions outside the chute. Moving objects and people seen through the sides of a chute can cause animals to balk or become frightened. Solid side walls are especially important if animals are not completely tame or they are unaccustomed to the facility.

Livestock have color perception. Numerous investigators have now confirmed that cattle, pigs, sheep and goats all possess color vision. Handling facilities should be painted one uniform color. All species of livestock are more likely to balk at a sudden change in color or texture.

A well designed, curved, single file chute with solid sides to block the animal's vision. White translucent skylights provide good lighting with no shadows. The black strip along the top of the chute (race) is flexible rubber conveyor belting. The belting blocks the animal's vision, and handlers can easily reach under the belting to move cattle.

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Self-Check-2

Written Test

Directions: Answer all the questions listed below.

I. Choose the correct answer

- The physical and mental well-being of an animal is -----
 A. Animal welfare
 B. Hazards
 C. OHS
 D. Safety
- Which one is **not** advantage of briefly out laid livestock farm
 A. Increase the profit,
 B. Decrease the production cost, and
 C. To increase the efficiency of operations in the farm
 D. None
- What is the plan view scale drawing or drawings of existing and future farmstead facilities as planned by the owner(s) of the business?
 A. Budget plan
 B. Site plan
 C. Farmstead plan
 D. Farm management

II. Discuss all the question below

- What factor do you consider in modifying farmstead structure?
- List types of poultry house?
- List unit of dairy farm structure in the modern dairy farm

Note: You can pass to the next LG if you answer all above question; if you are not satisfied, go back to Information sheet 1 and read then answer the question again.

Name..... ID..... Date.....

LG #44

LO #3- Determine Requirements

Instruction Sheet

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

- Assessing requirements for livestock handling and accommodation facilities
- Calculating number of livestock to be handle
- Estimating and measuring dimensions
- Negotiating cost structures.

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

- Assess requirements for livestock handling and accommodation facilities
- Calculate number of livestock to be handle
- Estimate and measuring dimensions
- Negotiate cost structures.

Learning Instructions:

1. Read the specific objectives of this learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 3

3.1. Requirements for livestock handling and accommodation facilities

Keep facilities and equipment in good condition to provide efficient movement and reduce stress when working livestock. Watch for nails, loose boards, and other hazards that could tear the hide or cause bruises or infections. The equipment should quickly and securely restrain the animal and should allow for the quick release of the animal upon completion of the procedures. Corrals, pens, and chutes should be the proper size for the number and size of animals and the type of processing to be done. Keep equipment clean and in good repair. Proper cattle handling requires the right facilities, equipment, and attitude.

3.1.1. Cattle Handling Facility

The size and complexity of a cattle handling facility depends on the number of animals in the herd.

A good handling facility should contain the following components:

- Head gate,
- Holding or squeeze chute,
- Working chute,
- Crowding pen,
- Holding pens,
- Scales, and
- Loading chute.

A discussion of each of these components follows.

1. Head gate

The head gate is the most important part of the entire working facility. It should be sturdy, safe, and easy to operate and should work smoothly and quietly. There are three basic types of head gates.

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- a. Self-catching-
- b. Scissors stanchion
- c. Full-opening stanchion.

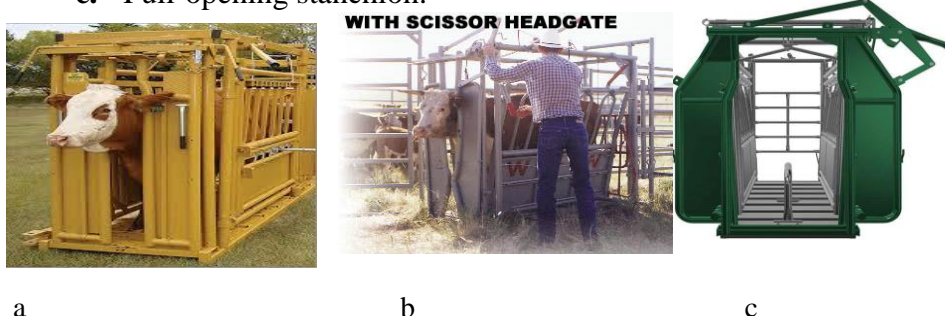


Figure 3.1. Head gate

The recommended types for small operations are the self-catching and the full-opening stanchion.

2. 2. Squeeze Chute

The squeeze chute is located immediately behind the head gate and secured to it.

The width of the squeeze chute should be adjustable for different sized animals, but should not be any wider than 26 inches. Squeezes can be manually or hydraulically operated. V-shaped sides are preferred because they support cattle, preventing them from going down and choking.

A 2-foot service gate at the back of the chute is desirable when working at the back of the animal (castrating, pregnancy testing, etc.) A palpation cage can be substituted for the service gate if desired



Figure 3.2 Squeezing cut

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2. Working Chute

The working chute leads cattle from the crowding pen to the squeeze chute. The purpose of a working chute is to hold cattle in a line so that they can enter the treatment or loading area one at a time.

Working chute sides should be solid. Solid walls prevent the animals from seeing the squeeze chute, people, and the truck until they are almost there. V-shaped sides are recommended, part of the working chute is offset by 30 degrees (maximum), so that cattle are prevented from seeing the squeeze until they are almost there. Straight working chutes are not recommended.



Figure 3.3 Working chute

4. Crowding Pen

The crowding pen is located at the back of the working chute. Size should be about 150 square feet, which will hold six to 10 head of cattle. A circular crowding area with solid sides works best. Funnel-shaped pens are a good alternative to circular crowding tubs for smaller facilities. The funnel-shaped pen should form a gradual V as it approaches the working chute. A solid crowding gate should be used to push animals from the V into the working chute.

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Fig 3.4 crowding pen

5. Holding Pens

Holding pens should be located so they fit conveniently with the rest of the facility. Each holding pen should provide approximately 20 square feet per animal.



Fig 3.5 Holding pen

6. Scales

Scales are essential for performance testing, evaluating gains, and determining sale weights. A single animal scale (usually portable) is most useful when determining the rate of gain and also in selecting breeding stock or determining how much weight cows are gaining or losing. The scales should be located so cattle can be easily moved on and off.

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Fig3.6. Scale

7. Loading Chute

The loading chute should be located directly off the crowding pen, allowing easy movement of cattle. A curved approach, 30 to 35 inches wide, prevents animals from seeing the truck until they are nearly loaded. The loading chute ramp can be either sloping or stepped. The maximum incline should be 30 percent



Fig3.7 Loading Chute

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Table 3. 1. Recommended dimension of cattle handling facilities

Facility Component	Recommended Dimensions		
	Up to 600 lbs	600 to 1,200 lbs	Over 1,200 lbs
Holding pen			
• Space per head (sq ft)	14	17	20
Pen fence			
• Height (in)	60	60	60
• Post spacing (ft)	8	8	8
• Post depth in ground (in)	30	30	30
Crowding Pen			
• Space per head (sq ft)	6	10	12
• Post spacing (ft)	4	64	64
• Solid wall height (in)	45	50	50-60
Working Chute			
• Straight side (in)	18	22	26
Chute fence			
• Post spacing (ft)	6	6	6
• Post depth in ground (in)	36	36	36
Holding Chute/Squeeze			
• Height (in)	45	50	50
• Width Straight sides (in)	18	22	28
• V-shaped sides, bottom width (in)	6-8	8-12	14-16
• Length-with headgate (ft)	5	5 - 8	5 - 8
Loading Chute			
• Width (in)	26	26	26-30
• Minimum length (ft)	12	12	12
• Maximum rise (in/ft)	3.5	3.5	3.5
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3.1.2. Sheep and goat handling facilities

Normally sheep and goats do not require elaborate housing facilities, but minimum provisions will definitely increase productivity, especially protection against inclement weather conditions and predation. Often, the flocks are penned in the open during fair weather and some temporary shelters are made use of in monsoon and winter. Sheep can be economically reared under ranch system.

Requirements of building units are more or less the same for sheep and goats, except that additional buildings are required for goats reared for milk. The shed site should be:-

- Easily approachable and spacious,
- Dry,
- Elevated,
- Well-drained and
- Protected from strong winds.
- East-West orientation ensures cooler environment.
- The cheapest -A “lean-to” type of shed

Loose housing is more advantageous as compared to conventional/stall-fed sheds because it is suitable for semi-arid regions and large-sized flocks, it involves less expenditure, it provides more comfort to the animals, it is less labor intensive, and it provides freedom of movement and gives the benefit of exercise. Stilted housing is common in areas with heavy rainfall.

Floor space requirements:-

In any type of housing for sheep and goats, adequate floor space must be provided. Recommended space requirements vary depending on animal size and the type of floor used. Adjustments may also be made depending on local climate and flock size. Additionally for animals managed totally indoors, an open yard for exercising is required. Sheep and goats should not be crowded and must have room to lie down. Overcrowding promotes ill health.

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Table 3.2. Floor space requirement in group

I. No.	Type of animal	Minimum floor space (m ²)
1.	Ram or buck in groups	1.8
2.	Ram or buck, individual	3.2
3.	Lamb or kids in groups	0.4
4.	Weaner in groups	0.8
5.	Weaner, individual	0.9
6.	Yearling, individual	0.9
7.	Yearlings in groups	0.9
8.	Ewe or doe in groups	1.0
9.	Ewe or doe, individual	1.2
10.	Ewe with lamb	1.5

Table 3.3. space recommendation in different floor types

Type of animal	Weight (Kg)	Floor Space (m ² /animal)		
		Solid floor	slatted	Open Yard
Ewe/ doe	35	0.8	0.7	2
Ewe/ doe	50	1.1	0.9	2.5
Ewe/ doe	70	1.4	1.1	3
Lamb/ kid	0.4 – 0.5	0.3-0.4		
Ram/ buck	3.0	2.5		
Pregnant ewes/does	2.0	1.5		

Table 3.4 . Recommended Dimension of sheds

Sl. No.	Type of shed	Size (m)	Height (m)	Maximum animals
1.	Ewe/doe shed	15 x 4	3	60
2.	Ram/buck shed	4 x 2.5	3	3
3.	Lambing/kidding shed	1.5 x 1.2	3	3
4.	Lamb/kid shed	7.5 x 4	3	75
5.	Weaner shed	7.5 x 4	3	75
6.	Yearling shed	10 x 5	3	50
7.	Sick animal shed	3 x 2	3	1
8.	Shearing shed and store room	6 x 2.5	3	
9.	Shepherd's room	6 x 4	3	

3.1.3. Poultry handling and accommodating facilities

Some of the intensive poultry production system facilities are: cage, automatic feeder, automatic drinker, lighting, fans, heaters etc,

- **Cage system**

Rearing of poultry on raised wire netting floor in smaller compartments, called cages

Initially introduced for individual egg & pedigree recording & culling of poor layers. At present, 75% of commercial layers in the world are kept in cages. The cage is suitable for keeping high density of birds, when space is limited. Scientific management practices can be followed. Feeders and waterers are attached to cages from outside, except nipple waterers, for which a pipeline is installed through or above cages. Auto-operated feeding trolleys and egg collection belts can also be used.

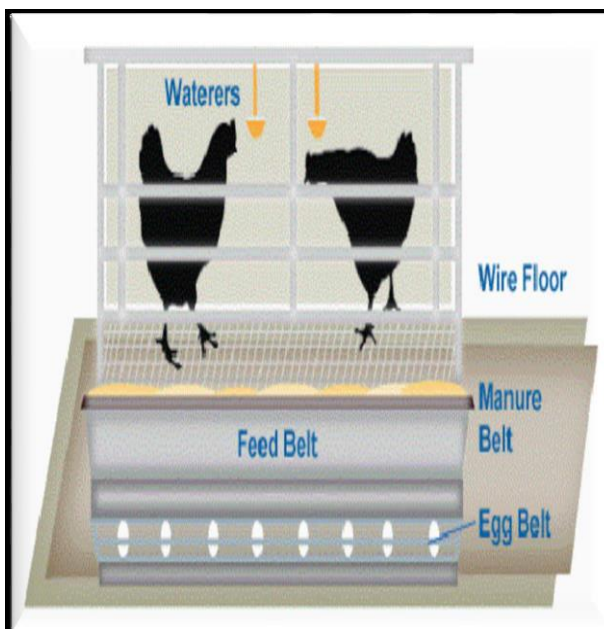
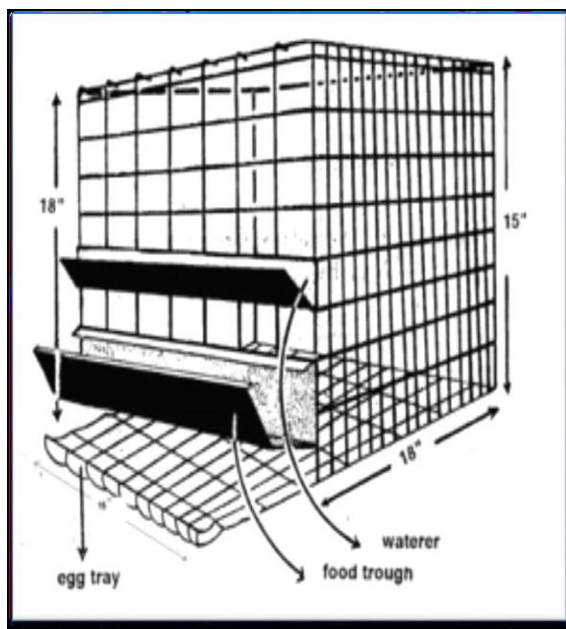
The droppings are either collected in trays underneath cages, on belts or on floor or deep pit under the cages.

Recommended floor space:

Chick (0 to 8 weeks) = 0.3 Sq.ft

Grower (9 to 16 weeks) = 0.5 Sq. ft

Layer (Above 17 weeks) = 0.6 Sq. ft



Floor slope: 1.5 inch per running 12 inch

Figure 3.8. Structure of cage

Types of cages

Based on the bird density:

- ✓ Single or individual bird cage (Only one bird in a cage)
- ✓ Multiple bird cage (From 2 to 10 birds)
- ✓ Colony cages (More than 11 birds per cage)

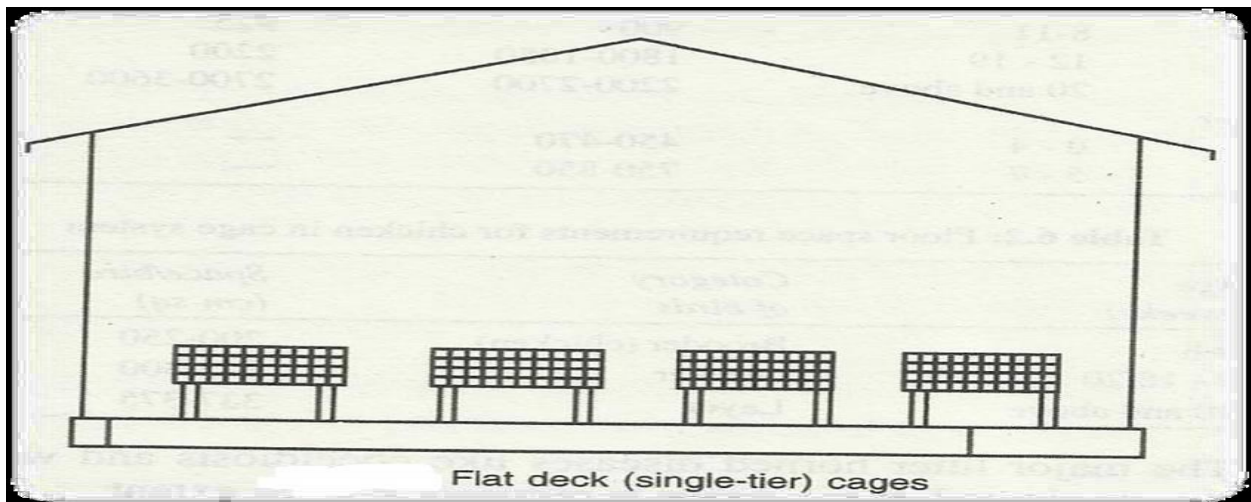


Figure.3.9: Individual cage

Based on the number of rows:

- Single-deck

- Double-deck
- Triple-deck
- Four-deck

Based on arrangement of cages:

- Battery cages (Vertical cages)
- ✓ Stair-step cages
 - a) M-type cages
 - b) L-type cages



Figure11: Battery cage

Based on the type of bird reared:

- Brooder / chick cages
- Grower cages
- Layer cages
- Breeder cages

3.1.3. Calculating number of livestock to be handled

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Animal units are used to determine construction requirements (and whether a manure management plan is needed). Animal units are also used to determine separation distances for operations first constructed.

To determine the number of animals units in an operation, multiply the maximum number of animals confined at any one time in the facility by the appropriate conversion factor. The appropriate conversion factors are in the table below. For example, a 1,000 head swine finishing barn would contain 400 animal units ($1000 \times 0.4 = 400$).

Animal Unit Conversion Factors	
Species	Animal Unit
Slaughter and feeder cattle	1.0
Immature Dairy Cattle	1.0
Mature Dairy Cattle	1.4
Swine over 55 pounds	0.4
Swine between 15 and 55 pounds	0.1
Sheep or lamb	0.1
Turkeys over 112 ounces	0.018
Turkeys less than 112 ounce	0.0085
Chickens over 48 ounce	0.01
Chickens less than 48 ounce	0.0025

3.4. Negotiating cost structures

Building design decisions are frequently influenced by cost considerations. Long-term investment in a structure that will optimize animal health and performance should take priority over any short-term cost savings.

It will usually appear cheaper to self-build than use a building contractor. However, it is essential to budget a realistic cost for family labor/staff time and incidental expenses, and consider the time it will take to complete.

3.4.1. Factor that affects cost

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Factors affecting cost of livestock house construction: - **Housing** cost varies from 25-90% of the total initial investment.

- Site.
- Housing system.
- Type of barn.
- Size of buildings.
- Number of buildings.
- Placement/arrangement of buildings.
- Building material used for the construction.
- design specification,
- Building quality of facility and the builder.
- Methods of cladding and masonry charges.

Construction costing

There are two major cost types for your cost structure. You have what are called **fixed costs**, which are costs that do not change and **variable costs**, which are costs that do change

It is understandable why good management is of cardinal importance, because irrespective of the capital costs of the farming enterprise (land, housing, pens, water supply and manure handling), operational costs can undeniably be attributed to low turnover relations

It is therefore recommended that the most economical infrastructure is created, that will still be cost effective.

Throughout the building production process, costs will have a major influence when choosing between alternative designs. An excessively high cost may even cause the whole project to be abandoned. In the initial stages, when rough sketches are evaluated, general guideline costs based on building area or volume may be sufficient.

In the final design stage, when the farmer has to decide whether or not to proceed with construction, a more detailed cost estimate based on a simplified bill of quantities is usually prepared.

Bill of quantities

The bill of quantities contains a list of all building materials required and is necessary to make a detailed cost estimate and a delivery plan. It cannot be produced, however, until the detailed working drawings and specifications have been completed.

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The items for a bill of quantities are normally grouped together under headings for either the main operations (excavation, foundations, walling, flooring, roof structure, roofing, finishing and external works) or the trades involved (earthwork, masonry, concrete work, carpentry and painting). Work normally carried out by subcontractors (wiring, plumbing, installation of equipment and furnishing) is listed separately.

Time schedule

The time schedule addresses the major timelines as regards to the actions to be taken and deliverables

A simple progress chart will considerably facilitate the planning of building operations and subsequent activities.

A contractor will require a more detailed chart for the actual construction operations to ensure the economical use of labor, materials and equipment

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Self-check 3	Written test
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Directions: Answer all the questions listed below.

I. Choose the correct answer

- Which facility leads cattle from crowding pen to the squeeze chute?
 - Crowding pen
 - Working chute
 - Squeeze chute
 - Head gate
- The facilities which locate at back of working chute is
 - Crowding pen
 - Working chute
 - Squeeze chute
 - Head gate
- The one which contains a list of all building materials required, detailed of its cost estimate and a delivery plan is ----
 - Budget plan
 - Bill of quantity
 - Cost variable
 - Component of farm

II. Answer following question

- List at least 5 components of cattle handling facilities
- Discuss the types of cost in the farm structure construction
- What are poultry handling facilities?

Note: You can pass to the next LG if you answer all above question; if you are not satisfied, go back to Information sheet 1 and read then answer the question again.

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LG #45

LO #4- Develop a final plan

Instruction sheet

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

- Preparing recommendation based on analysis of data
- Obtaining authorization and approvals for implementation plans
- Producing detail plan
- Modifying appropriate plan.

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

- Prepare recommendation based on analysis of data
- Obtain authorization and approvals for implementation plans
- Produce detail plan
- Modify appropriate plan

Learning Instructions:

2. Read the specific objectives of this learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 4

4.1. Preparing recommendation based on analysis of data

The kind of house and equipment will depend upon the particular kind of sheep/goat enterprise and the climatic conditions under which it must be operated. Below are examples of housing types for different production systems and agro-ecologies.

A well-developed farmstead plan can be a very effective communication tool. The plan can be a component of a business plan which can be used in the process of securing loans. It can communicate to the lender that there is a long-term facilities plan, and the lender can make a judgment of how feasible the plan appears.

The farmstead plan can be used to develop cost estimates for each of the components. Building contractors, equipment suppliers and excavators can use the plan to give preliminary and final cost estimates. These cost estimates can be used in the budget portion of the business plan. A complete farmstead plan with reasonable cost estimates can go a long way toward substantiating the facilities budgets in your business plan.

During the process of obtaining permits, a farmstead plan can communicate to regulators how facilities will be arranged to minimize the impacts on milk quality, groundwater and surface water quality, air quality, highway and property line setbacks, your well water quality, and other nuisances which your operation may pose to neighbors.

Current and/or future partners in the business can use the farmstead plan to understand how the facilities are expected to change over time.

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Facilities designers can use the farmstead plan to better understand space needs and relative distances between structures. Having a predetermined plan precludes placing a new structure at or too close to where a future structure should be placed. Most people are reluctant to remove a functional structure to build a new structure in the best location. With inadequate planning, many new structures get built at sites which are less desirable because of the presence of an existing structure.

Utility companies (electricity, gas pipelines, water, telephone, etc.) can use a farmstead plan to properly size and locate their lines and equipment. For example, an electric utility may want to install larger wiring, transformers and auxiliary generator cut out switches if they think the facilities may support a 1000-cow dairy in 10 years vs. one that may only grow to 200 cows in that time.

If the farmstead is sold, the plan can be used by the realtor to explain current facilities and how they fit into your future plans. This could be an invaluable sales tool.

4.2. Obtaining Authorizations and approvals required for implementation of the Plan

In the case of farm buildings and other structures where the size exceeds certain limits, or specific conditions are not met, exemptions no longer apply.

The following factors will be considered when an application for Letter of Approval is processed:

- Whether there is a need for erecting the structure(s) from the agriculture or fisheries point of view.
- The structure(s) must be used directly for farming purposes or related directly to the farming operation.
- The scale of production and marketing or selling of produce. Generally speaking, the applicant's farming scale should be commensurate with the structures proposed to be erected in order to substantiate his or her application

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- The applicant must be the owner of the farming land, a tenant or an authorized user of the land.

Building plans approval process

- i) Submission:- Submission of the building application
- ii) Circulation
- iii) Approval: - Construction can commence after the approval process is complete
- iv) Monitor: - Building inspectors then monitor the progress as per approved plan by visiting the construction site:
 - when foundation trenches are excavated
 - once the drains have been installed
 - on completion of the building
- v) Appeal: the applicant can appeal, if plans were not approved

4.3. Producing detail plan

The following are the major steps to follow in developing a farmstead plan:

4. Scale the map of the site, major details should be shown, and these include: contour lines of the topography; direction of north, highway and other existing roads; the direction of the best view; the direction of the prevailing winds; the direction of the principle slope; natural wind breaks or noticeable trees.
5. Choose location for the dwelling houses, the drive and the service-court area. The location of the dwelling houses should be chosen to take advantage of the view and should be upwind and upslope from the service buildings if possible. The service court areas should be near the center of the farm.
6. Locate the buildings for the major enterprise. These should be close to the dwelling houses as much as possible.
7. Complete farmstead layout, drawn to scale. Suitable scales are 1:2500 or 1:1000
8. A final design including all specifications of construction and materials can be made and a bill of quantities can be prepared.

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Zone Planning

The farmstead can be divided into four concentric rings, or activity zones :

- Zone 1. Family Living ;
- Zone 2. Machinery storage and service;
- Zone 3. Grain handling and storage, and small animal buildings; and
- Zone 4. Major livestock facilities.

Zone 1 includes the house, garage, guest parking, patio, recreation area, garden and orchard. It should have water for drinking, washing, cooking, cleaning, landscaping and gardening. It should be at least 30 m away from zone 2.

Zone 2 can include the farm workshop, machine shed, work yard, equipment parking, fuel and chemical centers, and transformer pole. Flammable materials are stored and used in this zone too, so provide a 30 m separation between buildings, to control fire spread. Store fuel and chemicals toward the outer perimeter of Zone 2

Zone 3 can include general-purpose and maternity barns, brooder houses, grain storage, handling and drying facilities, feed-processing equipment, and feed and fertilizer storage. Storage and processing units for grain and feed can be dusty and noisy when operating, so put them further from the house.

Zone 4 can include feedlots, hog, dairy, sheep, poultry and beef facilities, forage and silage storage, pastures, and manure storage and disposal.

Major livestock facilities are furthest from the house, largely because of odors, but also because of layout requirements. A large unit, involving either confinement housing or a dry lot, needs drainage, access, loading facilities, feed distribution and other services. Allow flexibility for future development and change.

Odors, dust, noise, and waste pollution are nuisances that can affect not only your farmstead but your neighbors', too. Waste management is a critical factor in any livestock operation and you must make suitable arrangements in the initial planning to avoid future problems. Isolation distances for livestock buildings depend on the kind of animals, their age and size, the size and type of structure, and the amount of care required

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Typical guidelines that may be adopted

The dwelling house should be at least 30 m away from the road.

The size of the central court should be adequate for easy maneuvering of equipment. The driveway or approach from the road should enter directly to the service area, and the entrance must be sufficiently wide for farm operations, with adequate visibility for safety – minimum 5 m wide. There should also be drives or lanes leading from the court to the various fields, pastures or out-buildings.

Livestock houses should be adjacent to the lanes so that animals have easy access to pasture, and feed and other supplies can be hauled into the animals

Dairy Barn or General-purpose barn – minimum 15 m from machine shed, but not too close to the dwelling house(s) (noise, order and flies). It should at least be at least 30 m from the house. The milk house should be near dairy barn

Pig House. Pig houses are frequently very malodorous. They should be about 60 m from the residence, and at least 30 m from the cow barn

Sheep, goat sheds and beef cattle Shelters may be treated in the same manner as the pig house, Depending on the size of the herd and location of structure.

Poultry house May be near the pig house, when chicken and feed are fenced in, but adequately spaced if either are allowed to run free. For convenience of feeding and egg collection, poultry house should be near the dwelling house, about 3 m away

Garage- It is often included in the machine shed and shop. It should be near the house for convenience, but not so close because of noise. A minimum of 20 m from the house is adequate.

Buildings for storage of crops should be located adjacent to the lane to the fields for easy access.

4.4. Modifying appropriate plan

If you plan to improve or expand your farmstead, or build a new one from scratch, you have to consider a number of factors before you begin.

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Farm planning is a decision making process in the farm business, which involves organization and management of limited resources to realize the specified goals continuously. Farm planning involves selecting the most profitable course of action from among all possible alternatives.

A good farm plan generally should have the following characteristics:

- a) An element of flexibility in a farm plan is essential to account for changes in the environment around the farm.
- b) A farm plan should maximize the resource use efficiency at the farm.
- c) It should provide for the attainment of the objectives of profit maximization through optimum resource use and balanced combination of farm enterprises.
- d) Risk and uncertainty can be accounted for in a good farm plan.
- e) The plan helps in timely acquisition and repayment of farm credit.

Remember, it must be planned so it can change and grow with the farming operation. Planning your farmstead is not an impossible task. Do not hesitate to ask your agriculturalist for help; he can also direct you to other sources when you need more detailed information.

Self-check 4	Written test
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Directions: Answer all the questions listed below.

I. choose the correct answer

- What distance should the pig house at least far away from residence?
 - 60 m
 - 30m
 - 100m
 - 500m
- The farmstead zone in which the flammable material are stored is
 - Zone 1
 - Zone 2
 - Zone 3
 - Zone 4

II. Write accurately the answer for the following questions

- Define a site plan? (2 points)
- List down the benefits of site plan? (10 points)

Note: You can pass to the next LG if you answer all above question; if you are not satisfied, go back to Information sheet 1 and read then answer the question again.

Name..... ID..... Date.....

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Operation Sheet 4	
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4.1. Techniques of Preparing detailed plan of broiler house

E. Materials tools and equipment

- Drawing paper
- Surveying tools (ranging pool)
- Pencil
- Set square (drawing kit)

F. Procedures

1. Prepare site plan
2. Prepare floor plan
3. Prepare elevation plan
4. Prepare cross section plan
5. Prepare master plan
6. Develop a blue print
7. Specify orientation

LAP Test	Practical demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 10 hours.

Task 1. Prepare detail housing plan of poultry farm

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The experts who developed the learning guide

No	Name	Qualification	Educational background	Institution	Phone number	E-mail
1	Terefe Tolcha	MSc.	Animal Production	Alage ATVET College	0911067132	terefetc@gmail.com
2	Moges Demilie	MSc.	Animal Production	Kombolcha ATVET College	0913326341	mogesdemilie@gmail.com
3	Murtessa Negessa	MSc.	Animal breeding and genetics	Mizan ATVET College	0923568489	murtessa12@gmail.com
4	Kassahun Kebede	MSc.	Animal breeding and genetics	Agarfa ATVET College	0920626996	kassk2006@gmail.com
5	Obsa Diriba	MSc.	Animal Production	Gewane ATVET College	0920022972	obsa9072@gmail.com
6	Areba Hussein	BSc.	Animal Production	Gewane ATVET College	0933161587	arebahussein7@gmail.com
7	Baisa Sirna	MSc.	Animal breeding and genetics	Mizan ATVET College	0921917546	baisasirna@gmail.com
8	Bekele Abdisa	MSc.	Animal Production	Agarfa ATVET College	0920839098	bakeabdi@gmail.com
9	Abera shiferaw	MSc.	Animal Production	Holeta Poly Technique College	0911556155	aberashiferaw@gmail.com