

Lesson 2: Arranging a Farmstead

A farmstead can be defined as a farm and its structures. Preparing a farmstead plan involves many variables and complexities. Developing a good plan requires considerable forethought and effort. This lesson outlines major considerations in farmstead planning and will show how to systematically address issues. Also, long-term goals must be kept in mind from the beginning to achieve the desired results. A good farmstead plan will involve research and outside help. Local University Extension offices are an excellent source of information and referrals.

Direction of Farmstead Layout

Farmstead planning often involves orienting activities in relation to one another and the farm's effect on surrounding areas. Efficiency of farm operation is a key to farmstead planning.

To be efficient, a farm will have to be laid out in a convenient fashion. Structures associated with related activities, such as feed storage facilities and feed lots, should be located near one another. In addition, the noise, dust, pollution, and insects associated with agricultural activities must be anticipated and directed away from residential areas, which can be a challenging proposition. These conditions occur to some degree in most farm enterprises, but if they are taken into account during planning, detrimental effects can generally be minimized. However, if a farm is the source of significant amounts of noise, dust, pollution, or insects, locating activities at a suitable distance from residential areas may be the only choice.

Orientation of structures according to the four directions is usually done to minimize the effects or take advantage of natural elements such as sun or a prevailing wind. Orientation of individual buildings is a function of the type of building, type of enterprise, and desired outcome of the structure's use. An example of this type of planning would be orienting a greenhouse with a large translucent wall to the south to gain extra sunlight or positioning a milking parlor with milk storage tanks receiving the least southern exposure possible to avoid sunlight, which will heat the tanks.

Topography

The actual topography of a large area would be very difficult, and perhaps impossible, to change, so a successful farmstead plan must take advantage of the resources and options to which the available topography lends itself. Drainage, the removal or flow of water from an area, and pollution are of particular concern when considering topography. Addressing these concerns in the planning stages is critical to an operation's success. For example, drainage of water from rain, snow, ice melt, or farm operations should be away from structures, with a slope of 3 to 5 percent. As water passes over the ground, it may erode soil; a slope of 3 to 5 percent will allow for drainage without promoting erosion. Water can also damage structures if allowed to drain into them, which is why a slope away from structures is advisable.

Pollution that may enter the watershed from agricultural enterprises must be managed. Exactly what constitutes a pollutant and what management practices will be required are generally governed by law and are specified in codes and regulations concerning specific enterprises and their by-products. Topography plays an essential role in pollution control in that understanding a given area's topography will provide an understanding of the direction and routes of drainage. Structures such as dams, holding ponds, or routing channels are sometimes effective in controlling the effects of pollution in a given area.

Topography is also a significant factor in regard to accessibility for machinery, water retention, and soil components. To some extent, topography explains why similar farm enterprises are located in similar geographic regions. Often, the reasonable uses of a property are limited or more adapted to a particular type of enterprise because of the topography of the area. An example would be marshy areas that may support rice production, but little else. Whatever the type of enterprise, the topography must be able to support the operation's activities profitably. A row crop operation will require relatively flat land with few stones. On the other hand, beef cattle operations may work well in a hilly, rocky area.

Wind

Home and Farmstead Planning

Wind erosion can be a significant factor in many farm enterprises, especially field crop enterprises. Historically, wind erosion has been devastating to farmsteads in susceptible areas. Preventing wind erosion may be impossible. Wind breaks are a key to success in dealing with wind erosion.

Most wind breaks are rows of trees strategically planted and spaced to interrupt a prevailing wind.

While they are helpful, establishing wind breaks is usually time consuming. Effective wind breaks need very careful planning; consulting an agricultural engineer is recommended if a large wind break is needed. Orienting a structure to act as a wind break is helpful in shielding small areas from a prevailing wind. For example, locating cattle holding areas on the side of a barn or milking parlor away from winds provides shelter for the animals.

Wind must also be considered when planning for enterprises that involve odors or airborne contaminants. Residential areas need to be protected from both of these problems. If the farmstead in question has a prevailing consistent wind, devising plans to address airborne contaminants may be easier. Such winds can be an advantage if they blow away from an area where windborne contaminants may cause problems. However, if a prevailing wind is carrying contaminants into an inappropriate area, the most effective solution is to locate the source of the odors or contaminants at a distance from other activities. Consulting with an agricultural engineer experienced in these issues may also provide aid in determining options. These problems may be controlled somewhat through the use of specifically designed ventilation systems and filters as well as regular cleaning and good waste management practices.

Heating and cooling requirements are affected by wind. Prevailing winter winds from the north are of considerable concern when evaluating heating requirements. Reducing the number of windows or their size on the north side of structures and taking advantage of wind breaks can be of help in reducing heating needs. Orienting farm structures to take advantage of wind for ventilation can help in meeting cooling requirements as well as enhancing livestock health.

Natural Resources and Environmental Impact

Natural resources are material sources of wealth that occur in a natural state, such as timber, water, or mineral deposits. Taking advantage of the natural resources an area provides is advantageous to farming operations. However, natural resources must be used in compliance with the regulations governing their use. These laws are designed to protect the environment and its inhabitants. Complying with these regulations can be complicated. The codes and regulations are constantly changing and evolving as the U.S. government becomes more and more involved in meeting concerns for public and environmental health. As a result, many agencies have been formed to monitor and ensure compliance with environmental regulations.

This focus on regulations greatly affects farmstead planning. Agricultural production has become a highly industrialized activity that involves countless chemicals and waste products, which makes agricultural operations subject to many regulations. These items all have the potential to damage the environment if misused. Generally speaking, any fuel, waste products, or chemicals used in amounts considered to be at a commercial level will be regulated. Each enterprise will have different circumstances, which will affect its regulatory requirements. Of particular concern is any contaminant that can enter and be spread in the watershed, contaminating valuable natural resources.

Type and Size of Business

Agriculture is a varied industry, and specific circumstances require individual consideration. The type and size of business affects many aspects of farmstead planning. It directly influences farm acreage needs, the number and type of structures required, the number and type of regulations affecting the operation, financing options, the source and amount of water, and waste management.

Farm acreage needs - Different enterprises require acreage suitable for their needs. Each enterprise's needs are different. A beef cattle operation may require hundreds of acres, while a greenhouse may only need half an acre. Careful consideration of future needs must take place during the first stages of planning if

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possible. The planner must think about what the operation might be like in 20 or 40 years.

Number and type of structures - The number and type of structures on a farmstead also must be adapted to the specific operation's needs. No one structure will meet every need. When planning a farmstead, an individual must do research to find information concerning the type of structures needed for a particular operation. Trade associations dealing with a particular type of enterprise are a good place to start asking questions. University Extension services may also be an excellent resource. Contract producers in the swine or poultry industries work closely with the processors with whom they contract to develop plans for farmsteads and structures designed for efficient operation.

Number and type of regulations - Research is required to determine what regulations might affect each aspect of the farmstead being planned. A county planning and zoning office would be an excellent place to begin a search for information. County Extension offices are also a good place to start. The planner will likely be referred to other agencies that deal with more specific details concerning the farmstead's planned operations. As a rule, larger operations require more and larger structures and produce more waste. They are therefore subject to more regulations.

Financing options - Because agricultural enterprises are generally businesses requiring a profit to be successful, financing options are critical. Agricultural operations have been lost to foreclosures and bankruptcies. Structures are expensive to construct and maintain, so careful planning is required when determining structural needs. Obtaining professional advice concerning farm financing is recommended. In areas where agricultural enterprises are common, professional accountants experienced in financing should be available.

Sources and amount of water - All farm enterprises require some amount of water. Many of them can require very large amounts, such as irrigated crop enterprises or large dairy operations. Water needs should be anticipated and evaluated in the planning stage. Often, water needs are greater than first expected, so careful research is required. The types of water sources, such as rivers, creeks, ponds, wells, and municipal water, and amounts they can

deliver must be considered as well. Planning for structures should take into account convenient access to water supplies and drainage of wastes away from water sources. Laws and regulations may affect the options for water for the operation.

Waste management - Waste management must be planned according to the codes and regulations governing the enterprise. This area of farmstead planning is often a complicated one.

Waste management structures such as holding tanks or lagoons are critical for the environment and must be planned carefully. The failure of these structures can lead to extensive damages for which the operator is liable. Lesson 2 of this unit contains more information about this topic.

Services and Utilities

Both the services and utilities available must be taken into account during farmstead planning. Utilities of an acceptable level and dependability must be available at a cost that will allow profitable operation of the chosen enterprise. Services that affect the particular enterprise in question must be available and consistent enough to allow profitable operation. Utilities and services include electricity, passable roads, fire protection, ambulance services, and telephone services.

Depending on the type of enterprise involved, the utilities and services needed can be extensive, and they may be critical to the success of the business. Two good examples are dairy and greenhouse enterprises. Power outages at milk times can be disastrous, as can an access road that the milk truck cannot use. Loss of heat to greenhouses during cold weather can devastate the entire inventory of plants.

Utilities and services must be considered when arranging the layout of structures. Overhead electrical lines should be located away from trees if possible, since falling limbs may break lines; underground lines tend to be more dependable. If water is supplied by a municipal source, structures must have suitable hookup access.

Planning for Neighbors

Home and Farmstead Planning

Laws and regulations, particularly zoning laws, will dictate much of what is acceptable when planning in regard to the neighborhood surrounding the farmstead. Most new agricultural enterprises will be required to locate in areas approved for these types of businesses.

The potential for zoning changes and urban encroachment in the future should also be taken into account. If such changes are a possibility, the farm's operations may not be allowed to continue, and structures may have to stand unused. Some other concerns need to be considered, such as pollution and runoff that may affect neighbors, especially when planning structures that involve or alter watershed activity.

For example, clearing timbered acreage to build a structure on a hill above a neighbor's home will create a greater amount of runoff, with the potential to damage a neighbor's home. Fences that separate properties and are used by both parties are worthy of consideration when forming a farmstead plan; agreeing on which party maintains the fencing may be important.

Regulatory Agencies

Regulatory agencies that are designed to protect the environment, its inhabitants, and natural resources have a direct effect on most farm enterprises. Compliance with regulations for such things as pollution control can be costly and involve considerable labor. Regulations may limit the size an enterprise can operate at successfully. However, they also work to ensure that the environment is safe for everyone. Two major regulatory agencies that provide guidelines and answers to questions for farmstead planning are the Environmental Protection Agency (EPA) and the Department of Natural Resources (DNR). State branches of these offices are excellent sources of information and will in most cases be an excellent place to start as well as a good source of referrals. Although this subject is large and complicated,

resources to aid in understanding these regulations are readily available from the sources mentioned in the lesson as well as many specific subgroups of these agencies. The local planning and zoning office may also provide answers to many questions, and the staff may have current recommendations for sources of information on anything that is out of their scope of expertise.

Summary

When planning a farmstead, developing a good plan can be accomplished by listing the desired facts concerning the proposed enterprise. The size and type of business and its specific needs must be defined. Factors such as the direction of layout, topography, wind, natural resources, utilities and services, and location of neighbors are another consideration. Compliance with regulatory agencies may have a great effect on farmstead planning.

Credits

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