PLANNING AND BUILDING OF STOCK-RAISING FARMS

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Keywords: Planning, Farmstead, Buildings, Space, Site

Contents

Summary

Planning a stock-raising farm requires the organization of buildings, outside lots, equipment, livestock, workers, utilities, traffic lanes and other facilities into an efficient profitable, attractive, integrated production unit for the present and the future.

Livestock production units require the handling of many materials such as feed, manure, livestock, produce, vehicles, etc. Organizing the movement of these materials into a complete, efficient system saves time and money. Each production unit will have its own set of conditions that must be considered when planning the layout. However, general principles in planning and building livestock farms can be helpful and are discussed in this section.

Body of the Contribution

This article will not discuss specific livestock buildings, but instead will discuss the combining of livestock buildings with related support facilities on the farm. Good farmstead engineering organizes the buildings, lots, equipment, livestock, workers, utilities, traffic lanes, and other facilities into an efficient, profitable, attractive, integrated production unit for the present and the future. Nearly all labor on stock-raising farms requires the handling of materials like feed, manure, animals, eggs, etc. Organizing the movement of these materials into a complete, efficient system saves time and money. Each production site will have its own set of conditions that must be considered when planning the layout. However, some basic guidelines apply to most sites and will be discussed here.

1. Site Selection Considerations

The site should be chosen carefully. A poor choice will be a handicap for the life of the facility. Select the best location available for an enterprise with sufficient space, good drainage, access to water and other utilities, and proximity to related operations. Also consider view, access, neighbors or other commercial operations, and utilization of existing topography. Look for natural topography that is relatively high, well drained, and level enough for placement of buildings, manure handling/storage facilities, and vehicle traffic. Naturally ventilated buildings require good exposure to prevailing winds. Always provide extra space for future expansion.

Building on a site with existing facilities may save money but also may be a constraint to efficient layout. Do not select a site just because of existing facilities since it may be a poor location for other reasons. Utilities such as water and electricity can usually be moved to new sites and are not the primary consideration in selecting the site. Space needs to be included in the plan for collecting and handling feedlot runoff, manure treatment and storage. Check all applicable regulations, zoning ordinances and environmental laws for a proposed location. The site may need sufficient land area nearby for manure disposal.

Provide easy access to public roads and markets. Provide traffic lanes on the site that service all required areas, will handle the types of vehicles necessary, and can be kept open in all weather conditions. The lanes, turning areas, and parking areas must have adequate clearances and turnaround space for existing and future vehicles. Some facilities have multiple site production with sufficient distance between sites to provide isolation between livestock groups and reduce disease transfer problems. Often two to three sites are needed that meet the following criteria, plus good access roads are needed between sites for efficient operation.

2. Space and Distance Requirements

The site for livestock production will require space for several items and services.

2.1. Livestock Areas

Buildings are needed for housing livestock and any livestock treatment units. Outdoor feedlots and handling areas may also be needed.

2.2. Clearance Between Buildings

Provide at least a 15 m clear space between buildings so there is sufficient space to reduce fire spread hazards, provide better wind access to naturally ventilated buildings, provide better access for service and fire control vehicles, and provide space for snow storage in cold climates.

More space between naturally ventilated buildings and large obstructions may be needed so that airflow through the building is not greatly reduced. There is evidence that some disease organisms remain viable in the air after they exit one building, but the viability decreases quickly over distance. More distance between buildings reduces the chance of disease transfer between buildings through the air.

2.3. Manure Facilities

Space is needed for manure collection, handling, treatment and storage facilities. Proper location is needed to enhance natural drainage of liquid manure to these facilities. Outside livestock lots need to have facilities to collect all runoff from precipitation so it does not run into natural water supplies before treatment. Space may be needed for fences around manure facilities to keep out children and pets. Make sure there is sufficient land nearby for land application of manure.

2.4. Roads

All weather vehicle access is needed for transporting livestock, feed, fuel and manure. Access for fire control and emergency vehicles, and for visitors needs to be considered. Routes need to be planned carefully so biosecurity is not compromised during routine operations.

Two sets of roads may be required—one outside the biosecure area and another inside the biosecure area. It is best not to allow vehicles to cross the biosecure barrier since they are difficult to sanitize. Roads need to be 4 to 5 m wide with an additional 2 m of clearance on each side for overhanging equipment. The inside radius of turns needs to be at least 5.5 m, and large vehicles like tractor-trailer trucks may need an outside radius of 34 m on 180 degree turns.

Do not make vehicles back up to turn around—provide loop drives or roads all the way around facilities. Provide plenty of parking at convenient locations for the workers, and parking near the entrance may be needed for visitors.

2.5. Clean Water Drainage

Waterways, diversion ditches or terraces may be needed to divert fresh water drainage around the livestock production facilities. This reduces flooding potential within the production area and prevents the contamination of the fresh water with manure.

2.6 Feed Storage and Processing Area

This may include grain storage and processing areas or bulk storage tanks for feed that is trucked in from the outside. Good all-weather roads are needed for this area since large vehicles are often needed to move large quantities of grain and feed. This area should be placed for easy access to the livestock production area but outside of any biosecure area. Feed hauling vehicles may cross the biosecurity barrier if cleaned and sanitized before entering. However, it is usually best if the feed can be conveyed across the biosecurity barrier, since it is very difficult to completely sanitize a large vehicle. Grain and feed processing areas should be at least 60 m from the living area to reduce dust, noise, and traffic problems.

2.7. Living/Management Area

An area for human housing is usually needed near to the livestock area. It may be a living area for the family or workers, or an area where management tasks can be performed. This area is usually placed near to the main road to allow easy access and to provide security for the livestock production area. The living area must be placed at least 30 m from the main road to improve safety and reduce nuisance problems. The living area should also be upwind from the livestock production area during the warm season. It should be at least 60 m from smaller livestock facilities and 90 m or more from larger livestock facilities. Allow space for shrubs, trees, or fences between the living area and unsightly areas in the production systems. Make the living area as pleasant as possible by reducing the common nuisances typical of livestock production such as odor, dust, insects, rodents, and noise.

2.8. Biosecurity Barrier

Many livestock production facilities managers will want to create a biosecure area around all the livestock to reduce problems with disease transfer into the livestock group from outside sources. Refer to Section 7 on biosecurity. Some type of barrier will be required to keep out any potential sources of disease organisms. This barrier is usually a fence, such as a chain link fence or a masonry wall.

This barrier needs to be far enough from the buildings to allow maneuverability of vehicles, yet not too far to keep costs down. If the barrier is solid, it will reduce wind levels and reduce airflow through nearby naturally ventilated buildings. Place solid barriers at least 15 m from buildings, especially naturally ventilated buildings. Weeds and shrubs that are allowed to grow around fences and buildings will have the same airflow reducing effect and should be controlled. An entry building is usually needed so workers can change clothes and possibly shower before entering the biosecure area.

2.9. Windbreaks/Sight Barriers

Livestock on outside lots and outside workers in cold climates will benefit from properly located windbreaks. Windbreaks will reduce wind approaching naturally ventilated buildings and reduce airflow through the buildings. If possible, locate windbreaks to reduce winter prevailing winds, but not block warm weather prevailing winds. Windbreaks will also drop snow for a considerable distance downwind and may block roads and cover lots in cold climates. Windbreaks will greatly reduce wind speed for a distance 2-3 times the height of the windbreak and slow the wind for a distance 10 times the height. Evergreen trees and densely branched shrubs make good windbreaks. A fence with about 80% solid area works well in tight areas.

It is often useful to place sight barriers to prevent the livestock or manure facilities from being seen from public areas. Complaints about odor and other nuisances are often reduced if the facilities cannot be seen. Well placed shrubs, solid fencing or walls can make the facilities more attractive and block the view that reminds the public that odor producing facilities are nearby. Any areas that are visible to the public should be kept as clean and neat as practical.

2.10. Machinery Storage/Repair Area

Buildings for storage, repair and maintenance of machinery and vehicles are often desirable. Facilities that need machinery both inside and outside of the biosecure area may need two sets of buildings. The machinery area should be located about 30 m from the living area and near the central road system for easy access. Fuel supplies are often kept near this area for convenience but should be at least 15 m from any buildings or other valuable facilities due to fire hazards.

2.11. Regulated Set Back Areas

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. These distances vary considerably with location but can be large and require a substantial amount of property. Therefore, site selection is very important in order to minimize set back area required.

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