

Other Technology and Landscaping Options for Reducing Emissions from Open Lot Livestock Facilities

Solid-set sprinkler systems

Solid-set sprinkler systems are an effective but expensive means of dust control in cattle feedlots. Research in California showed that interior corral dust concentrations increased 850% after sprinkler operation had ceased for two days. Sprinkler systems require a great deal of site-specific design based on seasonal water balance calculations, but in general terms, systems should have sufficient capacity to deliver 0.25 inch or more of water per day across the entire yard. Sprinkler patterns should overlap by 50% of the diameter of throw, and sprinklers should be located so that their throw does not extend all the way to the feed apron. Water for sprinkler systems should be drawn from a holding tank to avoid a demand peak on the main water system that may reduce drinking water delivery during the hot afternoon. Using holding pond effluent in sprinkler systems is an experimental technique that may reduce operation costs, but it may also increase the risk of disease transmission in the livestock. Until and unless research shows that the health risks are negligible, holding pond effluent should at least be blended with fresh water, if used at all. Water wagons with rear- or top-mounted pumps and sprinkler cannons operated on roads or alleys away from the feed bunk are an alternative to solid-set sprinklers. Water wagons are less capital intensive than solid-set sprinklers, but the operating costs (e.g., fuel, labor, road wear, “deadheading”) can be considerably higher.

Manure-harvesting equipment

Manure-harvesting equipment should permit skilled operators to leave a firm, smooth, and evenly graded corral surface with 1 to 2 inches of compacted manure on top of the mineral soil. Box scrapers, being “pull” blades, do an excellent job and are often adjustable with respect to blade depth.

Vegetative barriers

Vegetative barriers may be used to increase dispersion by elevating dust-laden air from the ground surface and mixing it with cleaner air aloft. Fast-growing trees also provide a visual barrier that may indirectly reduce nuisance complaints or improve relations with neighbors and passersby. Where flies are a persistent problem, however, vegetative barriers may make the problem worse by providing additional pest habitat.

Stocking density

Stocking density (number of animals per unit corral area), or its inverse, animal spacing, may be adjusted to compensate for increases in net evaporative demand (evaporation depth less the effective or retained precipitation), shifting the moisture balance in favor of dust control. Auvermann and Romanillos (2000) evaluated this option experimentally on a commercial feedlot in the Texas Panhandle and found that decreasing the cattle spacing from 150 ft² hd⁻¹ to 75 ft² hd⁻¹ reduced net (measured less background) PM₁₀ concentrations at the corral fence line by about 20%. As daily net evaporation increases, the effectiveness of increased stocking density is likely to decrease; furthermore, increasing the stocking density may induce behavioral problems and reduce overall feed-to-gain performance.

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Corral surface amendments

Corral surface amendments are still in the experimental phase with respect to dust and odor control. Crop residue mulches (waste hay, cotton gin trash) may cushion hoof impact and reduce the shearing that causes dust, and they may decrease the net evaporative demand by storing additional water and reducing evaporation rates. Resins and petroleum-based products, which have been shown to reduce dust emissions significantly from unpaved roadways, may also be effective, although the continuous deposition of manure on the corral surface suggests that these compounds would need to be reapplied frequently and would therefore be cost prohibitive.