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Using Weather Stations in Nebraska Livestock Operations

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Enforcement of environmental regulations placed on feedlots in Nebraska by the Environmental Protection Agency (EPA), have lead to an increased need for accurate documentation of weather variables. In addition to the need to monitor weather conditions for compliance, an accurate representation of current weather conditions within the microclimate of the livestock operation allow for proactive responses to periods of potential environmental stress periods (i.e. heat and cold stress). Currently, most producers use manual documentation of rainfall events, local weather forecasts and some degree of intuition to monitor weather conditions. Weather station technology exists to allow livestock producers to monitor on-site weather conditions and automatically document these for future reference.

Needed Documentation

Producers with NPDES (National

Pollutant Discharge Elimination System) permits must currently record daily rainfall amounts to satisfy EPA regulations, as well as document a 25 year 24-hour rainfall event or a chronic wet period. Should a producer experience a 25 year-24 hour event or a chronic wet period, the burden of proof lies with the producer to prove to the regulators (both EPA and DEQ) that a discharge was unavoidable. If documented and reported before the occurrence, a producer with a valid NPDES permit has the ability to discharge, in order to protect the integrity of his structure (to avoid a catastrophic event).

Weather conditions are also useful in determining and verifying days in which effluent should be applied to agricultural land. These applications are only allowed on "dewatering days", which are defined by DEQ as: those days which have suitable weather and soil conditions for land application of accumulated livestock waste.

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In addition to current required documentation, feedlot operators may also benefit from documentation of wind speed and direction on a daily basis and especially on days when manure, lagoon, or holding pond effluent is handled. Wind speed and direction can be a useful tool in determining whether or not a particular operation or land application area could have been a source of odor. Although current Nebraska legislation does not regulate dust and odor emissions, other states already have such provisions in place (i.e. Minnesota, Texas, and Kansas). Additionally, feedlots are susceptible to legal action under nuisance laws. Under these laws, the “enjoyment and use of his property” may not be interfered upon. This definition has been applied to odor emissions from feedlots.

Weather Station Uses

Numerous types of weather stations currently exist for use to monitor various weather parameters. These devices range from simple hand-held units, which monitor temperature, humidity, and wind speed, to comprehensive systems which can monitor in excess of 15 weather variables. Most producers likely can benefit from a moderately priced (\$500 - \$1000) unit which monitors and automatically records weather conditions. Such a system may record ambient temperature, relative humidity, wind speed and direction, and rainfall amount. The stations are configured such that data may be stored on the unit for future download, or may be directly linked to a computer for automatic download. The station can also be set up to

display the weather variables remotely. This can allow a producer to monitor the weather variables from their desk which can be useful in making management decisions. This application facilitates ease of use without additional requirements of employee time.

Weather stations also have uses outside of documenting weather conditions for regulatory compliance. They also allow for early recognition of weather conditions which may be detrimental to animal performance and well-being. Research at the University of Nebraska Northeast Research and Extension Center have shown that early intervention, using appropriate management strategies, can eliminate, or at least minimize, the effects adverse weather can have on livestock. Weather conditions vary with producer location, thus local weather reports may not accurately describe current conditions at the feedlot local.

Many stations also provide for calculation of degree days and evaporation rates. Knowledge of such parameters allows livestock owners/farmers advance notice of potential insect hatches as other crucial cropping information. Additionally, a higher degree of precision in matching crop water needs and application through irrigation with environmental information.

Conclusion

The presence of a weather stations in the day - to - day operations of confined livestock operations has many applications. Weather conditions may be recorded for future

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reference and knowledge of current conditions allows for improving animal and overall feedlot management. A list of weather station manufactures is included at the end of this report. This list is not comprehensive and does not imply endorsement of these manufactures by the authors or the University of Nebraska.

Contact information for weather station manufacturers

Campbell Scientific

www.campbellsci.com

435/753-2342

Columbia Weather Systems

www.columbiaweather.com

888/508-7375

Davis

www.davisnet.com

510/732-9229

LaCrosse Technology

www.lacrossetechnology.com

507/895-7095

Maximum, Inc.

www.maximum-inc.com

508/995-2200

Oregon Scientific

www.oregonscientificstore.com

888/414-8655

Peet Brothers

www.peetbros.com

800/872-7388

Rain Wise

www.rainwise.com

800/762-5723

Texas Weather

www.texas-weather.com

800/284-0245

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