United States Department of Agriculture
Natural Resources Conservation Service

CSP Drainage Water Management EDR-2 Attachment

Practice Description

CSP Requirements

In order ***to qualify for CSP Enhancement payments***, a producer must have a functioning Agricultural Drainage Water Management System (ADMS) and be willing to:

1) *Raise the water table* level during the winter (November through March).

2) R*aise the water table* to approximately 18-24 inches during a significant portion of the growing season (May through September).

Introduction

Agricultural drainage typically consists of surface ditches, subsurface conduits, or a combination of these that collect and convey water from fields. Using water management structures located at strategic locations in the field, an agricultural drainage water management system (ADMS) allows for the adjustment of the water table elevation. This allows the operator to control the amount of soil water during the year. When water is retained in the field through drainage water management, water quality may be improved by reducing the quantity of nutrient enriched drainage water leaving fields, and can provide production benefits by extending the period of time when soil water is available to plants.

Where to Apply the Practice

Drainage water management can be applied on drained fields where outflows from the drains can be controlled. Some older systems and many newer systems can be adapted to allow for the management of drainage water by installing drainage control structures.

The topography should be relatively uniform, and flat to gently sloping within a management unit or zone. Non-uniform water table depths can lead to non-uniform crop growth that complicates management decisions. Slopes of 1% or less are recommended. Water management structures should be placed every 1' to 1.5' change in elevation along the drainage ditch or conduit. As the slope increases, more water management structures are required. A way to minimize the number of water management structures is to install the drains along the contour. Structures should be located on main lines that serve a number of laterals in order to minimize the total number of structures required.

The impacts of ADMS should be evaluated with respect to adjoining properties.

Water Management Structures

Retro-fitting an existing subsurface drainage system involves the installation of water management structures. The management mechanism on the structures may be flash boards, gates, valves, risers, and pipes. Flash board risers allow flexibility in manual

management of the drainage water. Flashboard type risers can be full-round pipe risers or half-round pipe risers. The full-round risers are used when the control structure is located within the field, while half-round risers are used at the outlet.

Impacts of Drainage Water Management

Drainage water management can have a significant impact on the transport of nitrogen, phosphorous and sediment to surface waters and on crop production.

Lowering the water table increases the amount of water passing through the soil. Nitrates and soluble phosphorous move with the drainage water and are transported to the drainage outlets. A lower water table also reduces the frequency and magnitude of surface runoff, and thereby reduces the erosion potential, sediment transport, and the transport of sediment-adsorbed phosphorus. The aerobic conditions created in drained soils decrease the occurrence of denitrification.

Raising the water table decreases the amount of water passing through the soil, and therefore decreases the transport of nitrates and soluble phosphorous from the field. Raising the water table during the non-growing season can result in a 30% - 50% reduction in the discharge of nitrates. Raising the water table can also increase the amount of surface runoff, leading to increased erosion, sediment transport and transport of sediment-adsorbed phosphorous. Erosion and sediment transport can be controlled with residue management, buffers, grassed waterways, and other conservation practices. Anaerobic conditions created in saturated soils increases the occurrence of denitrification, further reducing nitrate-nitrogen in the drainage water

Partially raising the water table after crops are established can conserve soil moisture and may enable a crop to be more productive in the years where there is an extended dry period during the growing season.

A Basic Recommended Strategy

A high water table in the winter months will decrease the transport of nitrates and soluble phosphorus to surface waters. The water table should be lowered in the spring early enough for the field to be accessible for seedbed preparation, planting, and other field operations. Lowering the water table two weeks before field operations in the spring is generally sufficient.

After planting, the water table can be raised to conserve soil moisture for use by the crop during extended dry periods. Once the crop is established, evapotranspiration will often be sufficient to remove excess water from the root zone. It may be necessary to lower the water table during extended wet periods. Careful attention to drainage water management for water conservation may increase yields, particularly in dry years.