NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

CONSERVATION CROP ROTATION

(Acre)
CODE 328

DEFINITION

Growing crops in a recurring sequence on the same field.

PURPOSE

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion.
- Reduce irrigation induced erosion.
- Reduce soil erosion from wind.
- Maintain or improve soil organic matter content.
- Manage deficient or excess plant nutrients.
- Improve water use efficiency.
- Manage saline seeps.
- Manage plant pests (weeds, insects, diseases).
- Provide food for domestic livestock.
- Provide food and cover for wildlife.
- Maintain or improve soil quality.
- Produce and sequester soil carbon.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to all land where crops are grown.

This standard does not apply to pastureland, hayland, or other land uses where annual row or close-growing crops are only occasionally grown to facilitate renovation or re-establishment of orchards, vineyards, or nurseries.

CRITERIA

General Criteria Applicable to All Purposes Named Above

Crops shall be grown in a planned, recurring sequence except as outlined in Operation and Maintenance.

Crops shall be adapted to the climatic region and the soil resource.

Additional Criteria to Reduce Sheet and Rill Erosion

Crops shall be selected that produce sufficient above and below ground plant vegetative material to control erosion within the soil loss tolerance (T) or any other planned soil loss objective.

The amount of vegetative material needed shall be determined using current approved erosion prediction technology.

Additional Criteria To Reduce Irrigation Induced Erosion

To reduce erosion induced by sprinkler irrigation, crops or cover crops shall be selected that develop surface cover or canopy rapidly, or that produce the amount of residue needed to be maintained on the soil surface to achieve the soil loss objective. The amount of residue needed shall be determined by approved research or current approved erosion prediction technology.

Additional Criteria to Reduce Soil Erosion From Wind

Crops shall be selected that produce adequate amounts of vegetative material at the appropriate time, to control erosion to within the soil loss tolerance (T) or other planned soil loss objective.

The amount of biomass needed shall be determined using current approved wind erosion prediction technology.

Additional Criteria To Maintain Or Improve Soil Organic Matter Content

Crops shall be selected that produce the amount of vegetative material needed to maintain or improve soil organic matter content.

If partial removal of residue by means such as baling or grazing occurs, enough residue shall be maintained to achieve the desired soil organic matter content goal.

For assistance, contact the Conservation Agronomist.

Additional Criteria to Manage Deficient Or Excess Plant Nutrients

Crop selection and sequence shall be determined using an approved nutrient balance procedure.

When crop rotations are designed to add nitrogen to the system, nitrogen-fixing crops shall be grown immediately prior to or interplanted with crops having a medium to high nitrogen demand.

To reduce excess nutrients, select crops or cover crops having rooting depths and nutrient requirements that utilize the excess nutrients. (Refer to Cover and Green Manure Crop, Code 340).

Additional Criteria To Improve Water Use Efficiency

Consider soil droughtiness, seasonal rainfall, and crop selection to optimize water use efficiency.

Additional Criteria to Manage Plant Pests (Weeds, Insects, Diseases)

Crops should be alternated to break the pest cycle and/or allow for the use of a variety of other control methods. Affected crops and alternate host crops shall be removed from the rotation for the period of time needed to break the life cycle of the targeted pest.

Resistant or tolerant varieties, listed in appropriate university publications or other approved sources, should be selected where there is a history or reasonable potential of a pest problem.

Additional Criteria To Provide Food For Domestic Livestock

Crops shall be selected to balance the feed supply with livestock needs. The needed amount of selected crops shall be determined using an approved forage-livestock balance procedure.

Additional Criteria To Provide Food and Cover For Wildlife

Crop selection and management shall be determined using an approved habitat evaluation procedure for desired wildlife species.

Additional Criteria to Maintain or Improve Soil Quality

When low-residue quantities are produced by the row crop, a suitable cover crop shall be used to provide a source of biomass to support physical, chemical, and biological soil conditions.

The use of different types of plants (grasses, legumes etc.) shall be considered to provide diversity.

The selection of pesticides shall consider the impacts on the soil biology. Soil disturbance shall be held to a minimum.

Additional Criteria To Produce and Sequester Soil Carbon

Tillage operations or other soil disturbance shall be held to a minimum.

The amount of carbon sequestered shall be estimated using current approved methodology.

Suitable cover crops shall be used to offset residue removal or low-residue production.

CONSIDERATIONS

When used in combination with stripcropping, the crop sequence should be consistent with the stripcropping design.

When used in combination with residue management practices, selection of high residue producing crops and varieties, use of cover crops, and adjustment of plant population and row spacing can enhance production of the kind, amount, and distribution of residue needed.

Where erosion induced by sprinkler irrigation is a concern, the hazard can be reduced by basin tillage (dammer-diker), contour farming, no-till, or contour stripcropping.

Where maintaining or improving soil organic matter content is an objective, the effects of this practice can be enhanced by managing crop residues, utilizing animal wastes, no-till, cover crops, or applying mulches to supplement the biomass produced by crops in the rotation.

Where excess plant nutrients or soil contaminants are a concern, rotating deep rooted crops or cover crops with shallow rooted crops can help recover the nutrient or contaminant from the soil profile.

Where precipitation is limited, seasonal or erratic, moisture can be conserved for crop use by maintaining crop residues on the soil surface to increase infiltration and to reduce runoff and evaporation.

Crop damage by wind erosion can be reduced by selecting crops which are tolerant to abrasion from wind blown soil or tolerant to high wind velocity. If crops sensitive to wind erosion damage are grown, the potential for plant damage can be reduced by crop residue management, field windbreaks, no-till, cover crops, herbaceous wind barriers, intercropping, or other methods of wind erosion control.

Soil compaction can be reduced when rotations including deep rooted crops (able to extend to and penetrate the compacted soil layers) are used in combination with long-term no-till, controlled traffic, or management of grazing animals to prevent, or breakup, compacted layers.

Perennial soil conserving crops should be considered where erosion control, organic matter improvements, and moisture conservation are needed.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit, and should include the sequence of crops to be grown, length of time each crop will be grown, and the total length of the rotation.

Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

Rotations shall provide for acceptable substitute crops in case of crop failure or shift in planting intentions for weather related or economic reasons. Acceptable substitutes are crops having similar properties that meet the criteria for all the resource concerns identified for the treatment unit.