

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

CONSERVATION CROP ROTATION

(Acre)
CODE 328

DEFINITION

Growing crops in a recurring sequence on the same field.

PURPOSES

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, and diseases).
- Provide food for domestic livestock.
- Provide food and cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland and other 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 grown occasionally only to facilitate renovation or re-establishment of perennial vegetation. It does not apply to land devoted to orchards, vineyards, or nurseries.

CRITERIA

General Criteria Applicable To All Purposes Named Above

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

Crops shall be adapted to the climatic region and the soil resource. Adapted crops and varieties listed in appropriate University Of Illinois Cooperative Extension Service publications or other approved sources, shall be selected.

A conservation crop rotation may include crops planted for cover or nutrient enhancement. When using cover crops to achieve the purposes of the practice, see "Cover and Green Manure Crop" Practice Code IL-340.

Additional Criteria To Reduce Sheet And Rill Erosion

Crops shall be selected that produce enough above and below ground plant biomass to control erosion to the soil loss tolerance (T) or other planned soil loss level.

The amount of biomass needed shall be determined using the Revised Universal Soil Loss Equation (RUSLE). Calculations shall account for the effects of other practices in the conservation management system. Methods to estimate percent flat residue ground cover and develop crop residue budgets are described in Agronomy Technical Note IL-17 (Current Revision).

Additional Criteria To Reduce Irrigation Induced Erosion

To reduce erosion induced by furrow irrigation, crops or cover crops shall be selected that are

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

grown within the wetted perimeter of the furrow, or which produce the amount of residue needed to be maintained in the furrow to achieve the soil loss objective. The amount of residue needed shall be determined by approved research.

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 desired soil loss level. The amount of residue needed shall be determined by using the Revised Soil Loss Equation (RUSLE).

Additional Criteria To Reduce Soil Erosion From Wind

Crops shall be selected that produce biomass in amounts adequate, and at the appropriate time, to control erosion to the soil loss tolerance (T) or other planned soil loss level.

The amount of biomass needed shall be determined using current approved wind erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria To Maintain Or Improve Soil Organic Matter Content

Crops shall be selected that produce the amount of plant biomass needed to maintain soil organic matter content, as determined using the current approved Soil Conditioning Index Procedure.

Removal of residue left by harvested crops by baling, grazing, or other means is not recommended.

Cover and green manure crops planted specifically for soil improvement may be grazed, as long as grazing is managed to retain adequate biomass.

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 nitrogen-depleting crops.

To reduce excess nutrients, crops and/or cover crops will be grown that achieve rooting depths and

have nutrient requirements to sufficiently utilize the excess nutrients in the soil profile.

Additional Criteria To Improve Water Use Efficiency

Selection of crops and varieties, sequence of crops, or the annual decision to plant a crop or to fallow, shall be determined using an approved water balance procedure.

Additional Criteria To Manage Saline Seeps

Crops grown in the recharge area of saline seeps shall be selected for rooting depths and water requirements adequate to fully utilize all plant available soil water. Summer fallow will not be used. Crop selection and sequence shall be determined using an approved water balance procedure.

If excess subsoil moisture exists below the rooting depth of crops commonly grown in the recharge area, deep-rooted perennial crops shall be established for the number of years needed to dry the soil profile.

Crops grown in the discharge area of saline seeps shall be selected for their tolerance to salinity levels in the discharge area.

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

Crops shall be alternated to break pest cycles 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 long enough to break the life cycle or reduce the population of the targeted pest to below economic injury levels.

Resistant varieties, listed in University of Illinois Cooperative Extension Service publications or other approved sources, shall be selected where there is a history of a pest problem.

Additional Criteria To Provide Food For Domestic Livestock

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

Grazing shall be limited to periods where field soils are sufficiently dry and/or frozen to support livestock traffic.

Additional Criteria To Provide Food And Cover For Wildlife

Crop selection shall be determined using an approved habitat evaluation procedure.

Wildlife habitat can be enhanced by leaving rows of unharvested crop standing in odd areas adjacent to good wildlife cover or watering areas.

CONSIDERATIONS

When used in combination with CROSS WIND STRIPCROPPING (589B) or STRIPCROPPING CONTOUR (585), the crop sequence should be consistent with the strip cropping design.

When used in combination with RESIDUE MANAGEMENT (329 A, B, or C) 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 furrow irrigation is a concern, irrigating only alternate furrows may reduce the erosion hazard and provide better soil aeration.

Basin tillage (dammer-diker), contour farming or contour strip cropping can reduce erosion induced by sprinkler irrigation.

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, 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. Where winter precipitation occurs as snow, additional moisture can be obtained for crop use by trapping snow with standing residue, windbreaks, or other barriers.

Where improving water use efficiency on deep soils is a concern, rotating deep rooted crops with

shallow rooted crops can help utilize all available water in the soil profile.

Crop damage by wind erosion can be reduced by this practice by selecting crops that 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, herbaceous wind barriers, intercropping, or other methods of wind erosion control.

Soil compaction can be reduced by this practice when rotations including deep rooted crops (able to extend to and penetrate the compacted soil layers) are used in combination with deep tillage, controlled traffic, or management of grazing animals to prevent, or breakup, compacted layers.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard.

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 field or treatment unit.

In areas where summer fallow is practiced, the decision to plant a crop or fallow shall be made annually based on soil moisture at planting time. Fields shall be fallowed only when soil moisture is not adequate to produce a crop. If moisture supply is adequate but yield limiting, short-season shallow rooted crops shall be selected and grown. Deep-rooted crops shall follow shallow rooted crops in subsequent years, if needed, to utilize all plant available water in the root zone.