



Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

ROW ARRANGEMENT

CODE 557

(ac)

DEFINITION

A system of crop rows on planned directions, grades, and lengths.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Improve drainage.
- Reduce erosion.
- Facilitate efficient use of precipitation and irrigation water.

CONDITIONS WHERE PRACTICE APPLIES

Proper row arrangement as applicable—

- As part of a surface drainage system for a field where the rows are planned to carry runoff to main or lateral drains.
- To facilitate more efficient use of water in graded furrow irrigation systems.
- In dry-land areas where it is necessary to control the grade of rows to more fully utilize available precipitation.
- On sloping land where control of the length, grade, and direction of the rows can help reduce soil erosion as a stand-alone practice or in association with other conservation practices.

CRITERIA

General Criteria Applicable to All Purposes

Plan the arrangement of rows to meet the needs of the crop that will be grown, the size and type of equipment that will be used in the field, and the purpose of the practice. Plan the grade, length, and orientation of the rows so that runoff (either precipitation or irrigation) is conveyed along the rows without excessive erosion or damage to crops. Provide an adequate outlet, such as NRCS Conservation Practice Standard (CPS) Grassed Waterway (Code 412) at the ends of rows to manage runoff leaving the field.

Additional Criteria for Surface Drainage

Use row arrangement as part of a planned drainage system that includes surface ditches, waterways, or channels to carry water away from a crop field. Arrange rows to facilitate the removal of excess water from the crop field to receiving waters.

Refer to NRCS National Engineering Handbook (NEH) (Title 210), Part 650, Chapter 14, "Water Management (Drainage)" for acceptable velocities, grade, and depth of runoff in the rows based on the soils and crops grown in the field.

Additional Criteria to Reduce Erosion

Use row arrangement as part of a planned drainage system that includes surface ditches, waterways, or channels to carry water away from a crop field. Arrange rows to facilitate the removal of excess water from the crop field to receiving waters.

Refer to 210-NEH-650-14 for acceptable velocities, grade, and depth of runoff in the rows based on the soils and crops grown in the field.

Additional Criteria for Efficient Use of Precipitation and Irrigation Water

Use row arrangement to conserve water on fields in dry land areas by planning the orientation and grade of rows to inhibit the runoff of precipitation. Layout rows across the slope with little grade. Include row arrangement as part of a conservation plan that includes appropriate residue and tillage management and, as necessary, other erosion control practices to reduce the risk of excessive erosion during periods of heavier than normal precipitation. Limit row length to the maximum for level terraces in NRCS CPS Terrace (Code 600).

For furrow irrigation, arrange rows to carry irrigation water the entire length of the row. Refer to the irrigation guide for the local area for the proper row grade and length based on the soils and crops grown in the field.

CONSIDERATIONS

Row arrangement is most often used as a supporting practice in a cropping system that has special requirements. Consequently, plan row arrangements to accommodate the entire system. This might include accommodating special equipment needs, special crop needs, or other erosion control or water conservation practices necessary for an effective resource management system.

When row arrangement is used for water conservation consider the effects of reduced surface runoff from precipitation on the water budget for the area and on downstream areas such as wetlands, wildlife habitat, and adjoining landowners.

Row arrangements affect the infiltration of water into the soil (either positively or negatively) which in turn can affect the water budget of the area. Consider this effect when planning row arrangements.

If the rows are arranged to increase surface drainage from a field, ground water recharge may be negatively affected, and runoff may carry sediment, pesticides, and nutrients to offsite receiving waters. Consider the effects this runoff may have on the water quality of receiving waters, wildlife habitat, and other adjacent land uses.

On the other hand, if rows are arranged to increase infiltration, ground water recharge will be increased. In this case, consider any detrimental effects from pesticides and nutrients that might be carried into the ground water from increased infiltration.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for row arrangement that describe the requirements for applying the practice according to this standard. As a minimum, the plans and specifications shall include—

- A plan view showing the extent and layout of rows.
- Location of utilities and notification requirements.
- Maximum and minimum grades for rows, if appropriate.
- For furrow irrigation, typical row and furrow cross sections and row grades.
- Construction specifications that describe site specific installation requirements.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for the operator. The minimum requirements to be addressed in the operation and maintenance plan are—

- Periodic inspections, especially after significant rainfall events. As appropriate, include the following items:
 - Stability of discharge points.
 - Evidence of excessive erosion either along the rows or across the field.
 - Take corrective actions as necessary.
- At the end of the growing season, inspect to ensure the system is stable for the nongrowing season.

REFERENCES

USDA Agricultural Research Service. 2008. User's Reference Guide, Revised Universal Soil Loss Equation, Version 2. Washington, D.C.

USDA NRCS. 2001. National Engineering Handbook (NEH) (Title 210), Part 650, Chapter 14, Water Management (Drainage). Washington, D.C. <https://directives.sc.egov.usda.gov/>

USDA NRCS. 2001. National Engineering Handbook, (NEH) (Title 210), Part 650, Chapter 15, Irrigation. Washington, D.C. <https://directives.sc.egov.usda.gov/>

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