Phosphorus Best Management Practices
Protecting Water Quality

Strip Cropping

Author: Dennis Carman, P.E., USDA-NRCS, Little Rock, Arkansas

Definition:

Growing crops in a systematic arrangement of strips across a field. Types of strip cropping include contour, field or buffer.

Purposes:

- Reduce soil erosion from water
- Reduce the transport of sediment and other waterborne contaminants
- Reduce soil erosion from wind
- Protect growing crops from damage by windborne soil particles
- Improve water quality

How Does This Practice Work?

Strip cropping is effective due to the precise arrangement of the alternating strips in the field. The crops are arranged so that a strip of grass or close-growing crop is alternated with a clean-tilled strip or a strip with less protective cover. Generally, the strip widths are equal across the field.

Where sheet and rill erosion is a concern on sloping land, the strips are laid out on the contour or across the general slope. Where wind erosion is a concern, the strips are laid out as closely perpendicular to the prevailing erosive wind direction as possible.

Strip cropping is a multipurpose practice that has one or more of the following effects:

- Reduced sheet and rill erosion
- Reduced wind erosion
- Increased infiltration and available soil moisture
- Reduced dust emissions into the air
- Improved water quality
- Improved visual quality of the landscape
- Improved wildlife habitat
- Improved crop growth
- Improved soil quality

Where This Practice Applies and Its Limitations:

This practice is used on cropland and certain recreation and wildlife lands where field crops erosion from water or wind is a resource concern. It is most effective when grasses and legumes can be rotated with crops requiring more intensive cultivation. Strip cropping will not be effective when land slopes are longer than the critical slope length, unless supported by other practices that reduce slope length below critical (i.e., diversions, terraces).

Effectiveness:

Strip cropping is most effective when used in a planned conservation system that includes a combination of practices considering tillage, crop rotations and field borders. The effectiveness of this practice is maximized when the strips are as close as possible to the contour. Primary factors affecting erosion include climatic conditions, land slope, cropping intensity, tillage practices and soil erodability. Strip cropping is extremely effective in reducing erosion within the field,

Author's email
Dennis.Carman@ar.usda.gov

Editing and Design:
Forbes Walker
Wanda Russell
Gary Dagnan
Anne Dalton
University of Tennessee Extension

Developed by SERA-17, Minimizing Phosphorus Losses from Agriculture
http://sera17.ext.vt.edu/

NRCS

This project was funded in part under an agreement with the USDA-NRCS.

as well as soil particle transport off the field. Including alternating strips of increased soil cover, either through more intense vegetation such as grasses and legumes or increased residue, reduces erosion from detachment, reduces soil particle transport from the more intensely vegetated strip, and intercepts soil particles from the more intensely cultivated strips. It effectively acts as a buffer strip. Phosphorus particles may be attached to soil particles and are effective trapped and used within the cropping system.

Cost of Establishing and Putting the Practice in Place:

Strip cropping is one of the least costly conservation practices to install. This investment normally includes the cost of labor and/or fuel, and in some instances may involve a change in planned cropping sequences. The primary cost for installation could include the cost of establishing grasses and legumes in a long-term crop rotation.

Operation and Maintenance:

Vegetative Cover. Vegetation in a strip-cropping arrangement consists of crops and/or forages grown in a planned rotation. Erosion-resistant strips should be crops or crop residues that provide the needed protective cover during times when erosion is expected to occur. Acceptable protective cover includes a growing crop, including grasses, legumes or grass-legume mixtures; standing stubble; residue with enough surface cover to provide protection; or surface roughness sufficient to provide protection.

Alignment of Strips. Strip boundaries should run parallel to each other and as close to the contour as practical. Additional consideration should be given to the prevailing direction of erosive winds when wind erosion is a resource concern.

Strip Width. Base strip widths on the planning objective and the erosion prediction technology, considering water erosion and wind erosion where applicable.

Arrangement and Vegetative Condition of Strips. Strips susceptible to erosion should be alternated down the slope with strips of erosion-resistant cover. Erosion-susceptible strips are generally defined as row crops or fallow with less than 10 percent surface residue cover and minimal surface roughness when erosion potential is greatest. An erosion-resistant strip generally consists of dense grasses and/or legumes, hay crops nearing the end of the first year or row crops with surface cover greater than 75 percent during heightened periods of erosion.

A strip-cropping layout should not occur on a slope longer than the critical slope length unless supported by other practices that reduce slope length below critical (i.e., diversions, terraces).

Strip cropping may need to be used in combination with other conservation practices to meet the goals of the resource management system.

Design and install the strip layout to best facilitate operation of machinery used on the strips. To avoid point rows and partial machine passes, lay out strip widths with some multiple of full-width passes of seeding implements or sprayers.

The conservation crop rotation on strip-cropped fields should be consistent with the farm enterprise crop mix and/or associated livestock operation. These will influence the proportion of row crops, close-growing crops and meadow crops.

Wildlife benefits are enhanced by delaying mowing on sod turnstrips and grassed waterways until after the nesting season.

Sediment accumulations along strip edges should be smoothed or removed and distributed over the field as necessary to maintain practice effectiveness.

All farming operations should be conducted parallel to the strip boundaries, except on end rows with gradients flatter than the criteria set forth in this standard or where the end rows have at least 75 percent residue cover.

References:

Chepil, W.S. and N.P. Woodruff. 1963. *The Physics of Wind Erosion and Its Control*. Adv. Agron., 15: 211-302

NRCS Website: http://www.nrcs.usda.gov/

NRCS-Conservation Practice Standard 585, Strip Cropping. http://www.nrcs.usda.gov/technical/efotg

USDA Agricultural Research Service, Agricultural Handbook No. 703. 1997. *Predicting Soil Erosion by Water, A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE 97)*. Cropland Cover-Management Conditions, Chapter 6, Table 6-4.

Woodruff, N.P., L. Lyles, F.H. Siddoway and D.W. Fryrear. 1972. *How to Control Wind Erosion*. USDA., Agricultural Research Service. Agric. Inf. Bull. No. 354

For Further Information:

Contact your local conservation district, USDA-NRCS or Cooperative Extension Service office. Cost share may be available. Contact your local USDA offices.