



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/>



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

Terraces

Author: Dennis Carman, USDA-NRCS, Little Rock, Arkansas

Definition:

An earth embankment, or a combination ridge and channel, constructed across the field slope that intercepts, detains and safely conveys runoff to an outlet.

Purpose:

Terraces are used to reduce sheet-and-rill erosion and prevent gully development. Terracing reduces sediment pollution to lakes and streams, and traps phosphorus attached to sediment particles. Terraces may also retain runoff for moisture conservation.

How Does This Practice Work?

Terraces intercept runoff on moderate to steep slopes. They transform long slopes into a series of shorter slopes. Terraces reduce the rate of runoff and allow soil particles to settle out. The resulting cleaner water is then carried off the field in a non-erosive manner. Terraces reduce phosphorus transport by reducing soil erosion and runoff. Water erosion moves soil particles that have phosphorus attached. Sediment that reaches water bodies may release the phosphorus into the water.



Where This Practice Applies and Its Limitations:

Terraces can be used on fields where sheet-and-rill erosion or ephemeral gullies are a problem. They can also be used where runoff or sediment could impair water quality or cause damage downstream.

Terraces may be used where:

- Soil erosion by water is a problem
- There is a need to conserve water
- The soils and topography are such that terraces can be constructed and farmed with reasonable effort
- A suitable outlet can be provided
- Excess runoff is a problem

Effectiveness:

The erosion reduction potential of terraces ranges from 10 to 50 percent. Terraces are most effective when used in a planned conservation system that includes a combination of practices such as conservation tillage, crop rotations, contour farming and field borders. Primary factors affecting erosion include climatic conditions, land slope, cropping intensity, tillage practices and soil erodability.

Types of Terraces:

There are two types of terraces:

- **Storage terraces** collect water and store it until it can infiltrate into the ground or be released through a stable outlet.

Underground outlets with pipe intakes are the most common type of outlet.

- **Gradient terraces** are designed as channels to slow runoff water and carry it to a stable outlet such as a grassed waterway.

There are three typical terrace cross-section types.

- **Grassed backslope terraces** have a farmable frontslope with a 2:1 back slope (2 feet horizontal to every 1 foot of vertical drop). Downhill slope is seeded to perennial grass.



Grassed backslope

- **Narrow base terraces** have 2:1 slopes on both the frontslope and backslope. Both front and back slopes are seeded to perennial grasses.
- **Broadbase terraces** are flatter looking and are farmed on both slopes. This configuration will require a flatter land slope, normally less than 8 percent.

Cost of Establishing and Putting the Practice in Place:

The cost of terrace installation includes earth work costs associated with the terrace construction, the establishment of an adequate outlet such as a grassed waterway or underground outlet and vegetation establishment of the respective terrace slopes on grassed backslope or narrow base terraces.

Potential losses in production because of construction and some reduction in crop acres may result from terrace and waterway placement. Terrace construction costs vary widely and range from \$1 to \$6 per linear foot of terrace, with additional costs associated with construction of waterways and underground outlets for conveyance of water to the outlet.

Operation and Maintenance:

Where terraces are parallel, there are few problems with planting. If terraces are not parallel, consider how short rows (point rows) are best managed for farmability.

Avoid farming too close to intakes. Farming operations can cause ridges that block drainage of the terrace channel.

Remove sediment build-up in the terrace channel to maintain the required water-holding capacity.

Repair sections of the terrace that have eroded or have excessive settlement.

References:

USDA AG Handbook 703, NRCS National Conservation Practices Standards (600), NRCS Engineering Field Manual, and NRCS local field office technical guides. Specific information for this factsheet was taken directly from the NRCS Iowa Job Sheet on Terraces.

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.



Narrow base



Broadbase

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.