United States
Department of
Agriculture

Soil
Conservation
Service

Leaflet Number 570

Farming and Maintaining Terraces

Contents

List of figures 1

Introduction 2

Related conservation practices
Conservation tillage 6
Contouring 6
Contour stripcropping and rotations 7

Farming terraced land
Broad-base terraces 9
Grassed back-slope and narrow-base terraces 10

Maintenance
Underground outlet system 11
Grassed waterways 11
Maintaining vegetation 12
Maintaining terraces 12
Grassed back-slope and narrow-base terraces 14

List of Figures

1. Terrace systems depend on good management 2
2. Terraces are part of a complete conservation system 2
A. Common types of terraces 3
3. Broad-base terraces in cropland 4
4. Grassed back-slope terraces in cropland 4
5. Narrow-base terraces in cropland 5
6. Terrace construction and treatment of disturbed areas. 5
7. Cultivating terraced cropland. 6
8. Terraces with contour stripcropping. 7
9. Grassed back-slope terraces planted for wildlife nesting and cover 7
10. Terraced cropland showing field border 8
11. Parallel terraces on irregularly shaped field 8
B. Step 1. 9
C. Step 2. 9
D. Step 3. 9
12. Cultivating a grassed back-slope terrace 10
13. Pipe inlet with a large quantity of sediment 11
14. Grassed waterway with equipment damage . . .11
15. Well-vegetated back-slope terrace 12
16. Cover crop on grassed back-slope terrace 12
17. Sediment cleanout 13
18. No-till planting on terraces 13
E through H. Steps 1 through 4 14-15
19. Terraces can be an integral part of the landscape 15

Introduction

Terrace systems, in combination with other conservation practices, are used to help solve erosion and other resource problems. In addition to their esthetic appeal and promise of land stewardship, terraces can be the backbone of a cropping and water management system. How well terraces do their job of protecting cropland depends on how they are farmed and maintained.

Good management — which includes such practices as conservation tillage; proper methods of planting, fertilizing, and rotating crops; crop residue use; and controlling pests — is essential for the efficient production of healthy and vigorous crops (fig. 1). It is also important to soil and water conservation because it ensures production of adequate amounts of crop residue for erosion control.

The main function of terraces is to control and manage runoff, especially in the concentrated flow areas. This helps reduce gully erosion and conserves moisture. In some cases, terraces may also shorten the slope length exposed to overland flow, the area where sheet and rill erosion occurs. Modern terrace systems are mostly parallel. They are easier to farm and maintain.

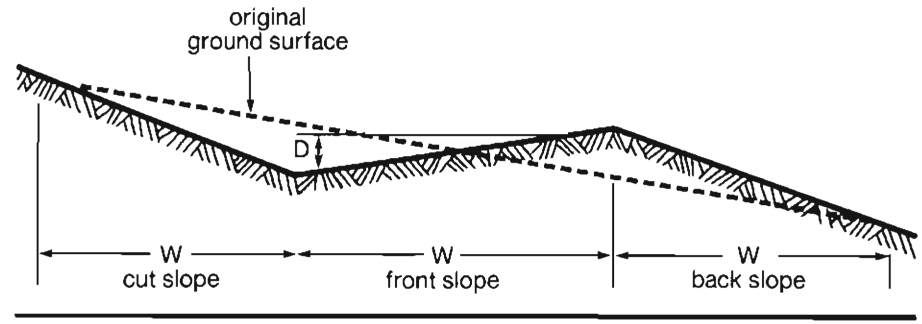
Terraces are one of a number of conservation practices used to reduce erosion. In most cases, one or more additional conservation practices are used with terraces to complete a conservation system (fig. 2).

Conservation tillage, contouring, and grassed waterways are conservation practices commonly used with terraces. These supporting practices are necessary to maintain terraces.

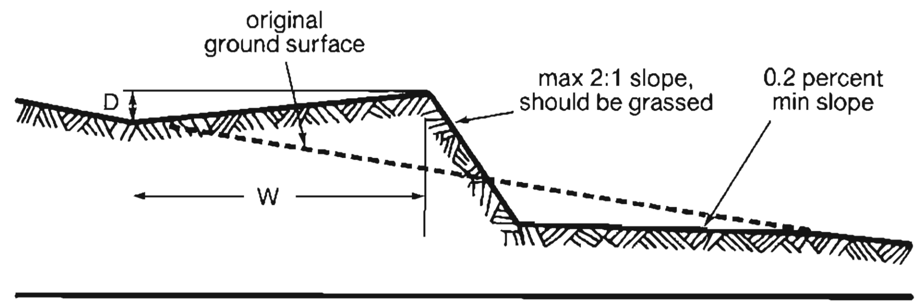
Figure 1

Figure 2

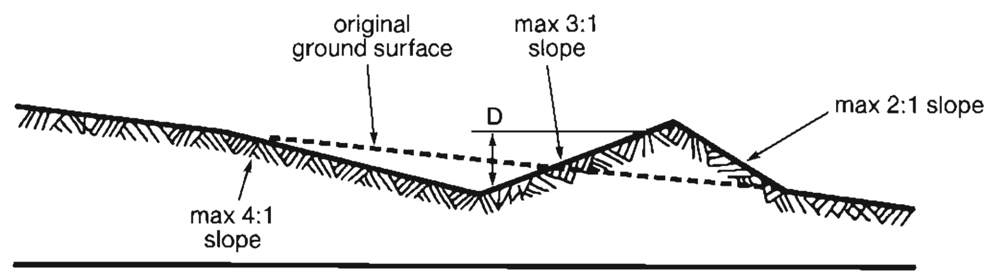
There are several types of terraces. The three most commonly used are broad-base, grassed back-slope, and narrow-base terraces (fig. A). Other terrace shapes used are the flat channel, or conservation bench terrace; the sediment control basin; and a combination of shapes. Suitable outlets include grassed waterways or underground pipes. On soils that have high infiltration rates, terraces are built level. Outlets are usually not needed for these level terraces.



Broad-base terrace cross section



Steep back-slope terrace cross section



Narrow-base terrace cross section

Figure A

Broad-base — All slopes of broad-base terraces are farmed, so they are designed to fit machinery needs. For best farmability, terrace spacing and the length of both front and back slopes should be multiples of the machine width. Don't straddle or cross terrace ridges with farm equipment. Move between terraces on planned field roads or grassed areas (fig. 3).

Grassed back-slope — The back slope is not farmed but seeded to permanent vegetative cover. Most of the soil used to build these terraces has been taken from the downhill side, resulting in a benching effect and some flattening of a part of the slope to be farmed (fig. 4).

Figure 3

Figure 4

Narrow-base — Both front and back slopes of these terraces are steep, seeded to permanent vegetative cover, and not farmed. During terrace construction, soil is usually pushed up from the downhill side. Much less soil is required to build these terraces than for the other types mentioned (fig. 5).

Special treatment should be given to the disturbed areas where soil has been taken to build the terraces. It may include additional liming, fertilizing, and ripping. Many of these disturbed areas need the topsoil replaced after construction or repair of terraces (fig. 6).


Figure 5


Figure 6

Related Conservation Practices

Conservation Tillage

Conservation tillage, which leaves all or a portion of the previous crops' residue on the soil surface after planting, is compatible with virtually all cropland conservation practices. Its use reduces erosion by 50 to 90 percent, as compared to conventional tillage, depending on the amount of residue left on the soil surface.

Combining conservation tillage and terraces can be an effective conservation system. Conservation tillage will reduce soil movement between terraces, which will lessen routine maintenance costs, while terraces shorten the length of the slope and control soil damage caused by concentrated water flow. If water conservation is your primary concern, terraces and conservation tillage will again work well together. Conservation tillage will slow water runoff, which will increase infiltration, and the terraces will keep surface flow from leaving the field.

There are basically four types of conservation tillage: no-till, ridge-till, strip-till, and mulch-till. For more information and technical assistance on these types of conservation tillage, contact your soil and water conservation district.

Contouring

Contouring between terraces is most effective in reducing erosion where outer rows are somewhat higher than middle rows as a result of cultivating for weed control (fig. 7).

Figure 7

Contour Stripcropping and Rotations

Where you choose to grow small grains and forages, you may widen and farm the spaces between the terraces. Plant alternating strips of row crops, meadow, and small grains (fig. 8). You may also use conservation tillage in the strips.

On the vegetated slopes, seed and manage desirable grasses and legumes suitable for wildlife nesting and cover (fig. 9).

Figure 8

Figure 9

Farming Terraced Land

You can often improve the farmability of the field and access by farm equipment by properly planning and constructing your terraces. A planned field border or a field road system, for example, can provide access to the field (fig. 10).

Where terraces are parallel, there is little trouble with farming. If terraces are not the same length, start all operations from the longest terrace (key terrace) to the shorter ones. Start all operations from the front slope of the key terrace (fig. 11).

Where possible, construct terraces parallel to each other; however, if terraces are not parallel, keep the correction area near the center between the terraces. This will eliminate turning on the terrace. You may also leave correction areas in sod instead of planting row crops. Although correction areas make up a small part of the field, they may cause the most problems during farming operations.

Figure 10

Figure 11

Broad-Base Terraces

Step 1. Plant on the inside slope of the top terrace up to the top of the slope or field boundary (fig. B).

Step 2. Plant down on the back slope of the top terrace to a point about half the distance between the top terrace and the one with the correction areas (fig. C).

Step 3. Plant from the key terrace of the lower parallel system up to the rows already planted. The correction area remaining near the center between the terraces can be planted from either side of the uneven area. Use the last terrace as a guideline to plant to the bottom of the field (fig. D).

Step 4. Follow the same procedure for additional tillage operations and harvesting.

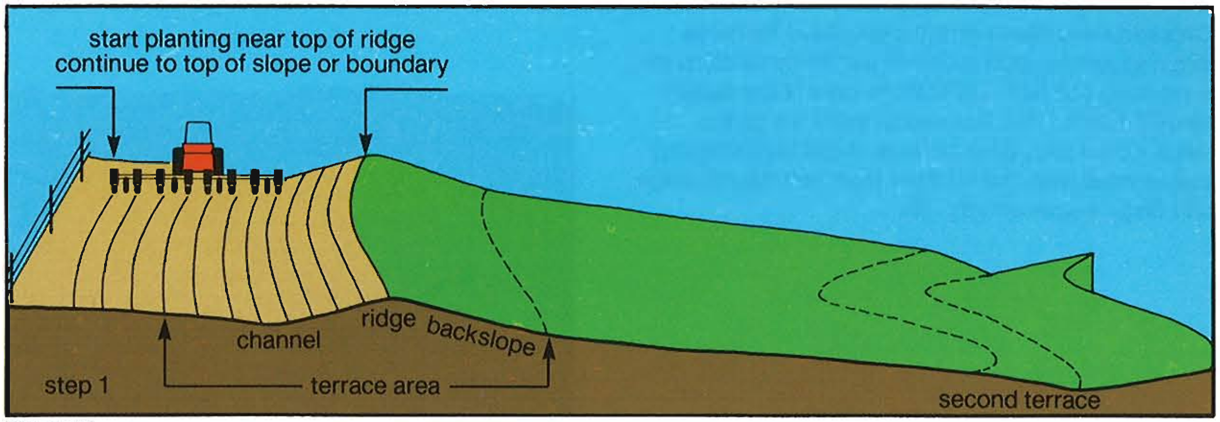


Figure B

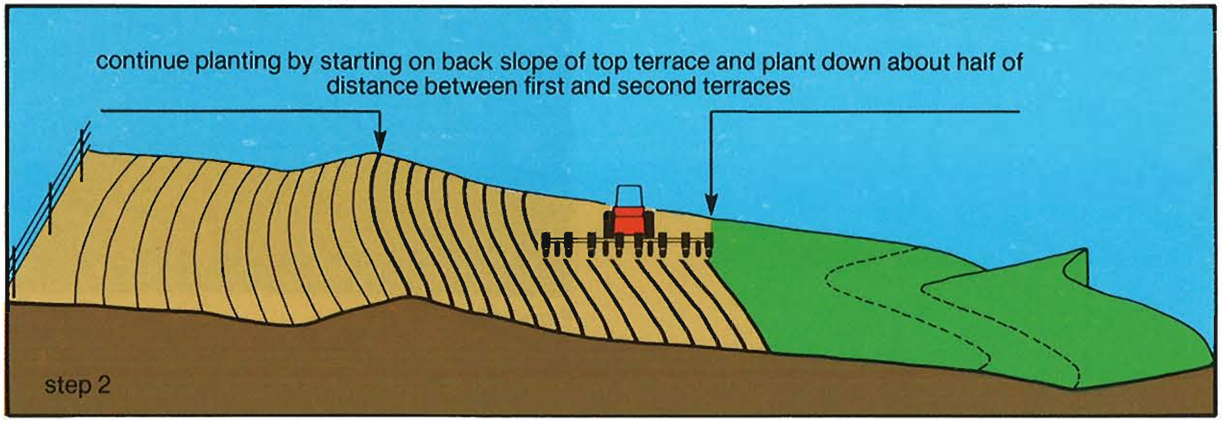


Figure C

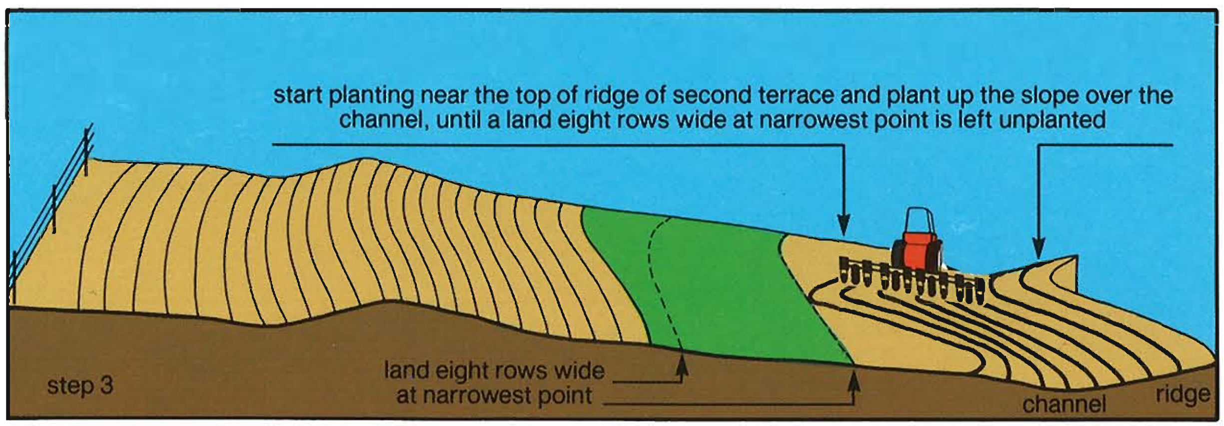


Figure D

Grassed Back-Slope and Narrow-Base Terraces
Begin all farming operations on parallel terraces on the front slope and work uphill to the base of the upper terrace. Farming with correction areas will be the same as on broad-base terraces. Avoid crowding vegetated areas, and protect them from herbicide damage and tillage equipment (fig. 12).

Figure 12

Maintenance

A good maintenance program will help assure long life and continued benefits from a terrace system.

Underground Outlet System
Periodically check underground outlets, animal guards, and tile inlets. Remove debris and sediment when necessary. Be careful that farming operations do not build ridges around inlet pipes. The ridges could block complete drainage of the terrace channel. If tile blowouts or other damages occur, make repairs immediately (fig. 13).

To protect inlets from damage by equipment, livestock, and wildlife, use high-visibility paint and risers. Fence around risers where livestock are present. Control tall grasses and weeds around the inlet. If wetness occurs in the terrace channel, install drains.

Grassed Waterways
The most common causes of waterway failure are abuse and neglect. Careless crossing with farm implements can severely disrupt areas of sod. Using the waterway as a field road leads to the development of bare areas that are vulnerable to erosion (fig. 14). If you must occasionally use the waterway as a road, travel along the edge, not down the center. At all times, maintain your waterway so that it supports the other conservation practices.

Figure 13

Figure 14

Maintaining Vegetation
Grassed back slopes and grassed narrow-base terrace slopes are critical areas. Establish and keep a good sod. Initially, fertilize the vegetated areas with the same amounts required to grow a good crop, such as corn. Follow up with maintenance applications. Control tree and brush growth by spraying or mowing, if possible. Prevent burrowing rodents from inhabiting the slope. Manage grassed waterways for hay production, or mow two or three times each year. Correlate mowing with bird nesting requirements. Protect against herbicide damage and tillage implements (fig. 15).

Maintaining Terraces
The first step in maintaining terraces is to prevent a need for sediment maintenance. This is done by controlling erosion in the interval between terraces. The most effective approaches are residue management, conservation tillage, and rotations (fig. 16).

Figure 15

Figure 16

The terraces' capacity to hold or channel water must be maintained. If low spots develop in ridges, repair the problem spots. When sediment does accumulate in channels, remove it by mechanical means and consider redistribution upslope (fig. 17).

Moldboard plowing between terraces is not recommended. Plowing increases sheet and rill erosion, with a resulting increase in sediment in the terrace channel. Dead furrows between terraces can also cause problems.

Use conservation tillage between terraces. This could range from using no-till to some other form of conservation tillage. Keep crop residues on the surface, as discussed previously in the section on conservation tillage. Always farm with the terrace system and never across it. This eliminates wearing down the terrace ridges (fig. 18).

Figure 17

Figure 18

Grassed Back-Slope and Narrow-Base Terraces
Begin all tillage and planting operations on the front slope of the terrace or at the toe of the front slope of the narrow-base terrace, and plant upslope to the next terrace.

Step 1. On parallel broad-base terraces, begin tillage and planting operations at the terrace ridge and proceed both upslope and downslope until you have covered about one-third of the area between the terrace ridges. Do this on each terrace; then work out the remaining areas between the terraces (fig. E).

Step 2. When farming nonparallel terrace systems, begin all tillage and planting operations at the terrace and work both upslope and downslope from the terrace. This leaves all short rows near the middle of the terrace spacings. Before beginning the short rows, be sure there are sufficient end rows between the terrace and the beginning of the short rows to turn on without causing damage to the terraces or to the equipment (fig. F).

Step 3. Till extra rounds on the wide parts of the remaining area until you have an even turnstrip extending the entire length of the field. This allows tillage of the irregular areas without turning on the tilled ground (fig. G).

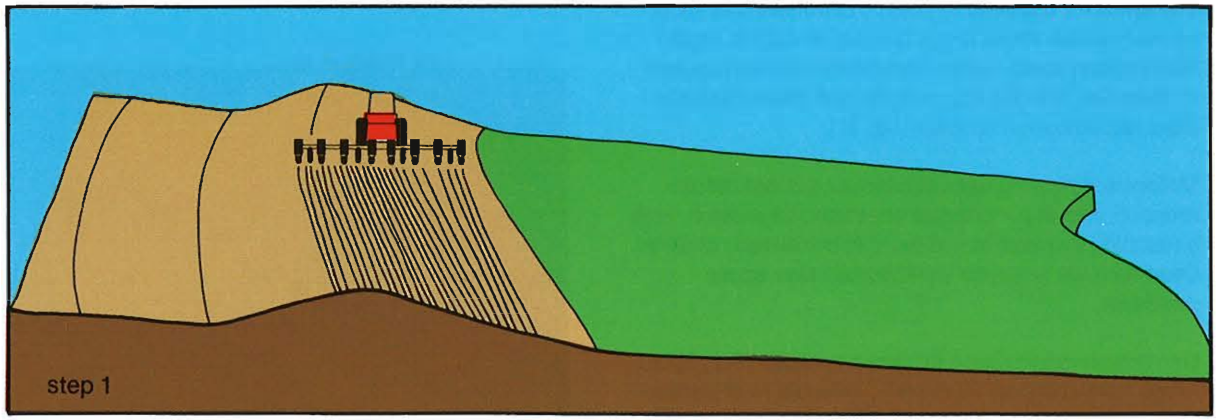


Figure E

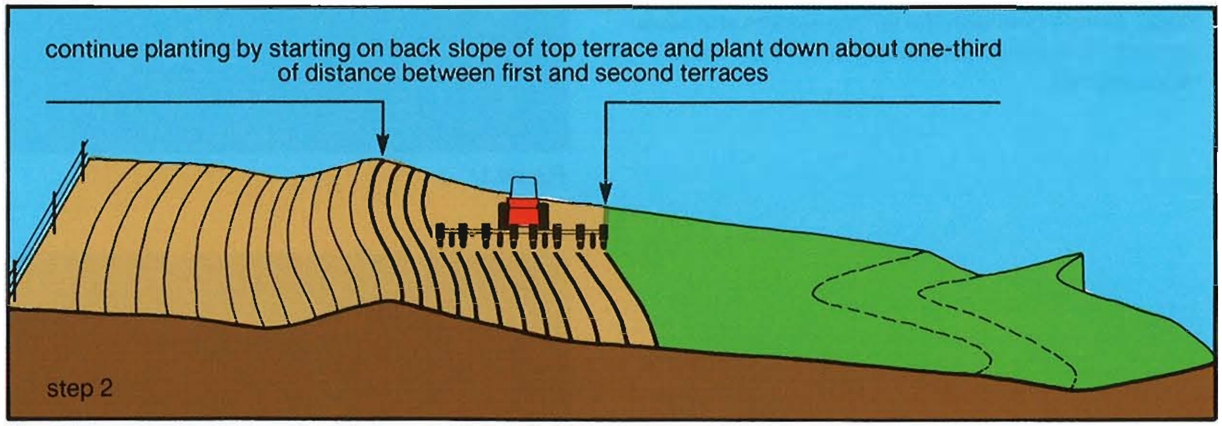


Figure F

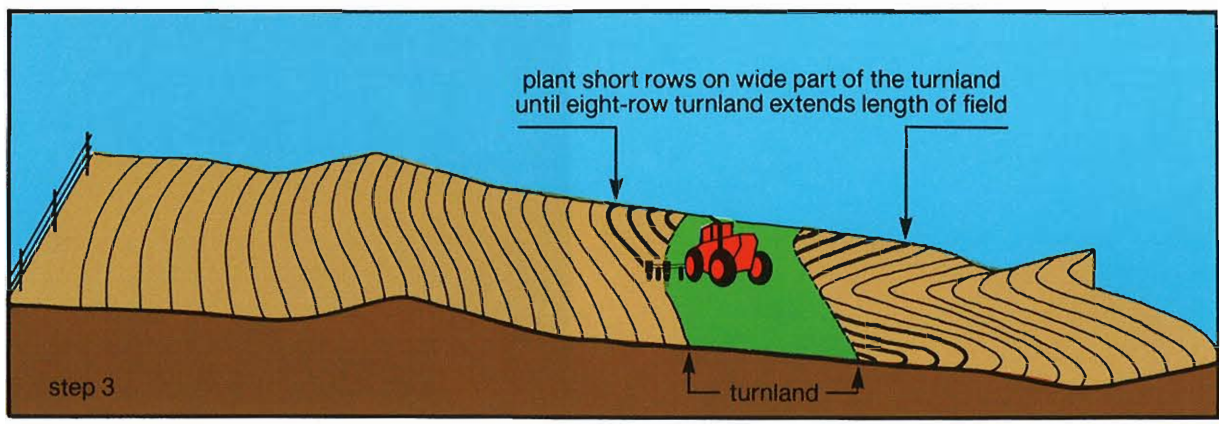


Figure G

Step 4. Till the uniform-width turnstrip (fig. H).

The terrace ridge height is critical to maintaining adequate capacity and protecting lower terraces. Quickly repair any damages to the terrace ridge.

Effective erosion control and resource conservation require that both management and structural practices are coordinated in a complete soil and water conservation system. How well terraces do their job as part of this system depends on how you farm and maintain them (fig. 19).

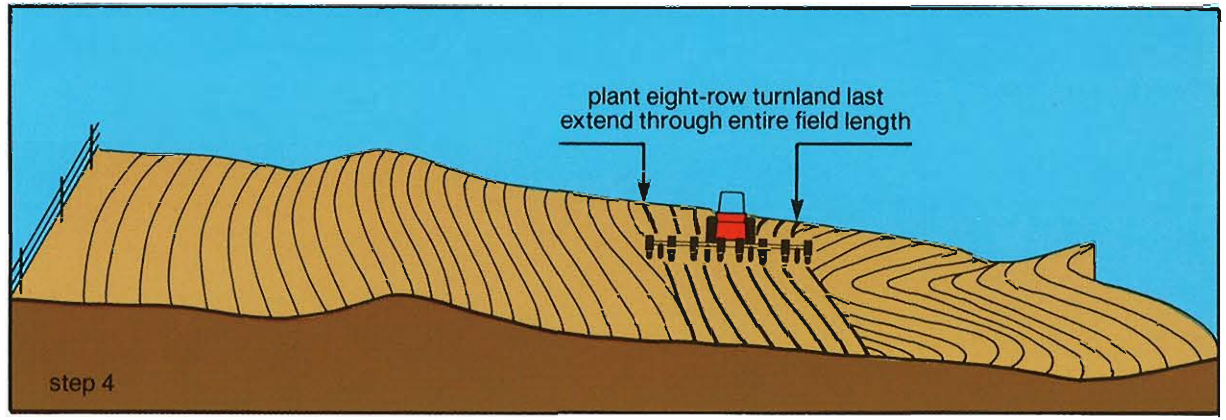


Figure H

Figure 19

Supersedes Farming Terraced Land, Leaflet 335
Reprinted April 1980

May 1987
Reviewed and approved for reprinting June 1990.