

EARTHEN BUND

This is the most popular soil conservation structure in the country and it is practiced at large scale all over India. Farm bunds are constructed on agricultural land with the aim of arresting soil erosion and improving the soil moisture profile. Ideally, bunds on farms should be made on the contour line. It would lie along the boundary of the field. Land holding in the project area is very small and it is not possible or feasible to construct contour bund or graded bund in the field. The earthen bund is divided into three types on the basis of the slope of the land and size of field. It would help to conserve the water in the field and maintain in situ moisture in the field. The erosion of the field is reduced. The waste weir in the field helps to safely disposal of the excess water from the field.



Control Soil Erosion

After falling on the ground, rainwater carries off with it precious top soil. Due to this action of rainwater, rills are formed in fields, which soon become small drains. It must be remembered that every year in our country 6.6 billion tonnes of top soil and 5-8 million tonnes of nutrients are lost due to soil erosion. India is losing soil 30 to 40 times faster than the natural replenishment rate. We should also keep in mind that it takes over ten thousand years to form a cm thick layer of fertile soil. It is estimated that if these soil losses are prevented the productivity of agricultural can rise by 30-40 %. By dividing the field into several units, bunds control the volume and velocity of runoff in each such unit. The water in the field and the soil it is carrying are stopped at each bund. Thus, by not allowing water a long stretch of free flow, bunds break the momentum of water.

Spacing

The distance between bunds must be 30-80 m. This decision depends on the slope of the field. That is, the greater the slope, the lesser the distance. The lesser the slope, the greater will be the distance. In highly sloping land, water will run off very fast. Thus it will have to stop more frequently.

STRIP TERRACING/BENCH TERRACING

Bench terracing means construction of nearly level steps like fields along contours usually by half cutting and half filling procedure. It is an earthen embankment or a ridge and channel, constructed across the slope at a suitable location to intercept surface runoff water. It may be constructed with an acceptable grade to an outlet or with a level channel and ridge. By adopting bench terracing, both degree and length of slope are reduced which help in soil moisture conservation for enhanced crop production. Bench terracing is recommended for slopes from 10 to 30%.

Functions of Terracing in the Conservation Programme

1. One of the best mechanical measures
2. Properly located, constructed and maintained terraces
3. Reduce runoff and soil losses.
4. Prevent the formation of rills and gullies
5. Assist in reclaiming badly eroded gullied fields by intercepting the runoff before it becomes concentrated and attains an eroding velocity
6. To be effective, they must be used in combination with other practices, such as stubble mulching, contouring and strip cropping.
7. Over a period of years, better crops may be expected on terraced land because of the soil and moisture they conserve.



Design of Bench Terraces

The following factors have direct bearing on design of bench terraces

1. Soil depth and uniform spreading of top soil
2. Slope of land
3. Rainfall amount
4. Farming practices and proposed crops to be grown
5. Basic design parameters
6. Terrace spacing
7. Terrace grade along the width & length
8. Terrace cross section

Terrace spacing

Terrace spacing is the vertical distance between two successive bench terraces. It is equal to the double the depth of cut. It depends on the soil depth and land slope. The width of terrace should be such that it enables convenient and economic agriculture operations.

STAGGERED CONTOUR TRENCHES

In medium rainfall areas with highly dissected topography, Staggered Contour Trenches (SCT) are adopted. The length of the trenches is kept short around 2-3 m and the spacing between the rows may vary from 3-5 m. The chances of breaches of SCT are less as compared to Continuous Contour Trenches. Over time, experience of watershed programs has shown that it is better to stagger the digging of contour trenches. This is



because it has been found that invariably errors have been made in contouring over long distances. If the contour trench is not level and by mistake sloped, then water starts to flow from the

high point to the low point, cutting a path and in-creasing soil erosion. Therefore, instead of making trenches continuously, they should be in a staggered, discontinuous manner.

Therefore, instead of making trenches continuously, they should be made in a staggered and discontinuous manner. Dig a trench 2 m long on a contour line. Give a gap of 4 m. Dig another 2 m trench along the contour. The trenches are further dug in the similar fashion along this particular contour. Then, come to the next contour line. Begin digging in a stretch, which covers the gap left in the higher contour line. The gaps in this contour line should fall below the trenches in the higher contour line. In this way, we maximize the amount of harvested runoff by the trenches. In other words, chains of staggered trenches should be made along successive contour lines so that water left by one line of trenches is captured by the immediately lower line.

In areas where there is an abundance of trees and vegetation, gaps in excavation are in any case essential to allow space for the roots of the trees to spread. Also, where there are hard rocks underneath the soil, trenches must be staggered.

Design: Size of trench depends on the depth of soil and also on some other factors of watershed. In general, the most popular size has been used in the many watersheds is with a depth of 50 cm and a width of 50 cm.

Berm: The mud excavated is piled up 20 cm away, downstream of the trench. This gap between the trench and mud is called the berm. This distance is essential so that this mud does not fill up the trench again.

Plantation: If grass has to be planted along the trenches, then the excavated mud should be piled up in a 10cm. high rectangular layer. If trees have to be planted, they should be planted either in the space after the trench or on either side of the trench.

Staggered Contour Trenches: Step-by-Step:

1. Measure the slope in one section of the ridge area. Ensure that it is between 10 - 25%;

2. Draw a straight line with wet lime between the highest and the lowest points along the slope;
3. Decide the interval between successive lines of trenches;
4. On the straight line, marks points at the decided interval;
5. Starting from each mark, demarcate the contour line;
6. Dig staggered trenches along these contour lines;
7. Depending on the specific conditions (such as thick vegetation, rocks etc.),leave gaps in the excavation from place to place;
8. Make sure that the water left out of one line of trenches is stopped by the line of trenches below;
9. Undertake plantation as seems appropriate;

Staggered Contour Trenches: Don'ts

1. Do not make trenches on slopes higher than 25%. Instead adopt vegetative measures
2. Do not make trenches on slopes less than 10%. Instead construct contour bunds
3. Do not excavate trenches where there is already dense vegetation
4. Do not plant inside the trench
5. Do not excavate if roots of a tree are encountered
6. Do not excavate trenches across large streams or drainage lines



Centripetal Terracing



Rain water Harvesting Pit

(The rates for the above works will be as per the rates approved by the Block Panchyat under MGNREGS)