

Contour barriers

All kinds of barriers can help to slow down run-off water from rain. This will reduce soil erosion and help to store more water in the soil for the benefit of crops.

Barriers can be built of whatever materials are locally available. They can be made of stones, old crop stalks

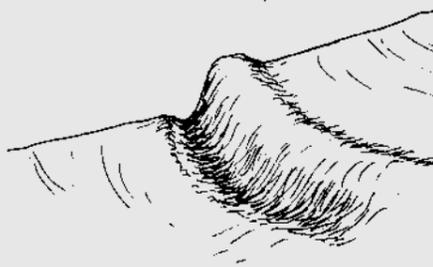
and leaves, or earth mounds, or by leaving strips of grass or vegetation unploughed.

Over time the land between the mounds will become less sloping as earth collects against the mound. Specially tough grasses such as napier (elephant grass) or vetiver are ideal

for planting along contour mounds. Not only will they provide fodder for livestock, but their roots will provide a tough, lasting barrier against erosion.

Contour strips will improve crop yields by helping to conserve rainwater in the soil. This is particularly important if rains become less reliable.

Contour mounds built of earth should follow this shape.



Measuring contour lines with an A-frame

Contour lines are completely level lines across a slope. When building rainwater bunds or dykes or building contour mounds to control soil erosion, contour lines must be first identified. If people guess, this will result in bunds or mounds which may collapse during heavy rain and fail to prevent the rainwater flowing away.

The A-frame is an easy and well-tested method for measuring contour lines. It can be made at no cost from local materials.

Materials needed

- 2 poles about 2 metres long
- 1 pole about 1 metre long
- some string
- a stone

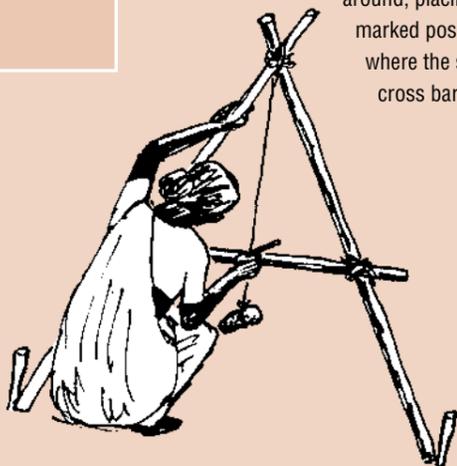
STEP 1



Tie the poles very tightly together to make the shape of a letter A. Hang the stone from the top of the A-frame, making sure the stone hangs below the cross bar.

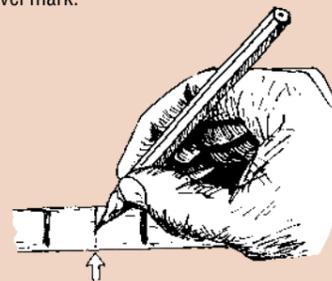
STEP 2

Hold the A-frame upright and mark exactly where the poles touch the ground. With a pencil, mark where the string crosses the cross bar. Turn the A-frame around, placing the poles in the marked positions. Again mark where the string crosses the cross bar.



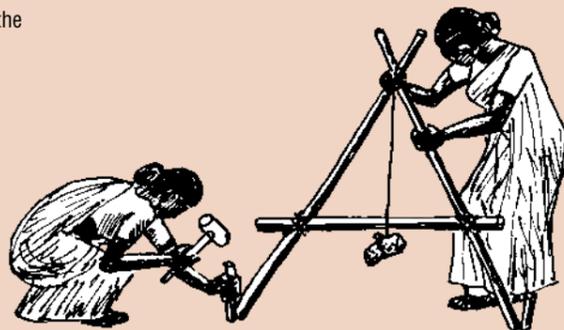
STEP 3

Mark the 'level mark' on the cross bar – exactly half way between the previous marks. If the first two marks happen to be in the same place, this is the level mark.



STEP 4

Before using the A-frame, collect a number of sticks. Begin at one side of the land where the first contour line is wanted. Hold one pole firmly on the ground. Move the other pole until the string touches the level mark. Place a stick into the soil by each pole. Move the A-frame along the field, alternately moving each pole (pivoting).



STEP 5

This will result in a line of small sticks. Smooth out any sharp bends in the line and use this line as the guide for building bunds and contour mounds.



STEP 6

To find the position of the next contour line, stand with one arm stretched out. Walk backwards down the slope until an identified contour line can be seen in line with your arm. Make the next contour line where you now are now standing.



WARNING: In areas that have very heavy storms, it may be dangerous to prevent all of the rainwater from flowing down a slope. Build waterways or drains with a very slight downhill angle of 1/2°–1° so that excess water is safely channelled away.

Alley cropping

Compiled by Isabel Carter

Alley cropping is a technique that is very useful for improving poor soils, providing fodder for livestock and protecting the soil from heavy rainfall.

Alley cropping is a simple way of combining tree-growing with crops. Rows of suitable trees are planted about 5 metres apart, usually by direct seeding into the soil at the beginning of the rainy season. In between the rows of trees, crops or vegetables are grown as usual. On sloping ground, the rows must be planted along the contour – across the slope. Alley cropping may also give some protection during irregular rainfall as the rows of trees help to trap rainfall in the soil.

The tree seeds are planted close together in the rows so the young trees form a hedge. If possible, try to mix several different species to form a hedge. Once the trees reach shoulder height (1–2 metres high) they are cut right back to just 20–30 cm in height. The leaves can be left on the ground as a mulch to rot down and add nutrients to the soil. Alternatively, they can be collected and used to provide animal fodder. The remaining stumps quickly grow back and the cutting can be repeated for many years.

Alley cropping adds plant nutrients and improves soil structure. It protects soil from heavy rains. It is low-cost and easy to do, although it does require a



Photo ICRRAF

lot of labour to cut back trees. Without regular cutting, they will grow tall, develop thick trunks and compete with the crops.

Alley cropping should not be used in very dry areas. The trees will be more difficult to establish. Once established, the rows of trees will use what little water is available in the soil and make it more difficult for crops to grow.

Alley cropping requires a good supply of seed from the right kind of trees. It is important that only legume trees are planted, as their roots add plant nutrients to the soil. In many areas legume trees are already growing and they often produce plentiful supplies of seed. Legume trees produce seeds in pods and usually have small, divided leaves. They also tend to have deep roots that do not compete much with crops for water. If possible, get local advice on the best species to plant.

> Recommended species of tree

LATIN NAME	SOME COMMON NAMES
<i>Acacia albida</i>	acacia, kad, haraz, winter thorn
<i>Calliandra calothyrsus</i>	calliandra, cabello de angel, barba de gato, barbillo, barbejolote, clavellino
<i>Cassia siamea</i>	cassia, sélé, amarillo, kassod
<i>Gliricidia sepium</i>	gliricid, cacahuananche, madre de cacao, madriado
<i>Leuceana leucocephala</i>	leuceana, guage lamtoro, ipil ipil, subabul
<i>Moringa oleifera</i>	moringa, arzantiga, mbum
<i>Sesbania grandiflora</i>	sesbania, agati, bagphal, pan hatiya, tuwi, sesban, murunga, zapaton blanco