



Centurion
UNIVERSITY

Shaping Lives...

Empowering Communities...

Soil and water Conservation Engineering

Presented By-

Shubham Kumar Sarangi

Asst Professor

**DEPARTMENT OF AGRICULTURAL ENGINEERING, SoABE
CENTURION UNIVERSITY OF TECHNOLOGY AND
MANAGEMENT PARALAKHEMUNDI, ODISHA**



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

Measures for conserving soil

Biological measures: It is also known as agronomical measure and termed as vegetative measure and sometimes called the best management practice.

It is adopted for the land slope **less than 2%**.

- Control of erosion through vegetation, crops and agronomical practices is called biological measures.
- The role of agronomical measure is more economical, long lasting and effective.



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

Biological/Agronomical measures
include

- Contouring or contour cultivation
- Cropping systems
- Tillage practices
- Mulching



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

CONTOUR CULTIVATION (Contour Cropping/Farming)

- Carrying out agricultural operations like planting, tillage and inter cultivation very nearly on the contours across the land slope.
- As each row acts as a barrier to water flow rainfall is conserved in low rainfall areas.
- In low rainfall regions the primary purpose of contour cultivation is to conserve the rain water into the soil as much as possible.
- In humid regions its basic purpose is to reduce the soil erosion by retarding the overland flow.



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

Contour cultivation





Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

Use of contour cultivation

- Contour cultivation is most efficient for reducing the runoff and soil erosion from gentle land slopes.
- Wischmeir and Smith (1978) have reported the values of land slope and slope length for better contour farming.
- The limits of slope length change with the soil characteristics, type of crops grown and rainfall of the area.
- The length of slope is used as greater on more permeable soils, for more protective cover crops.



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

- Better in field of relatively uniform slope.
- Practice of contouring on 2 – 4% slopes increase crop yield by 10% and reduces soil loss by 50%.
- Contour farming is one of the most effective methods for soil and water conservation and thereby increases productivity in dryland areas.
- Crops grown – Maize, Sorghum, Pearl millet



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

Limitation of contour cultivation

- The effectiveness of contour farming decreases with increase in slope gradient and slope length, and increasing intensity of rains.
- If the rainfall exceeds the surface detention capacity of the contouring system, concentrated runoff flowing downstream leads to accelerated erosion and even severe gulling.
- Therefore, contour farming alone is not sufficient to control erosion on steep, long slopes, erodible soils, and during erosive rains.
- The major drawbacks of contour farming are frequent turning involving extra labour and machinery time, and loss of some area that may have to be put out of production.



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

Strip cropping





Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

Strip cropping

- Strip cropping is the practice of growing strip of crops having poor potential for erosion control, such as root crop (intertilled crops), cereals, etc., alternated with strips of crops having good potentials for erosion control, such as fodder crops, grasses, etc., which are close growing crops.
- Strip cropping is a more intensive farming practice than contour farming. The farming practices that are included in this type of farming are **contour strip farming, cover cropping, farming with conservation tillage and suitable crop rotation.**



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

Close growing crops act as barriers to flow and reduce the runoff velocity generated from the strips of intertilled crops, and eventually reduce soil erosion.

Strip cropping is laid out by using the following three methods:

1. Contour strip cropping
2. Field strip cropping
3. Buffer strip cropping



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

i) **Contour strip cropping:** In contour strip cropping, alternate strips of crop are sown more or less following the contours, similar to contouring. Suitable rotation of crops and tillage operations are followed during the farming operations.

ii) **Field strip cropping:** In a field layout of strip cropping, strip of uniform width are laid out across the prevailing slope, while protecting the soil from erosion by water.

To protect the soil from erosion by wind, strips are laid out across the prevailing direction of wind. Such practices are generally followed in areas where the topography is very irregular, and the contour lines are too curvy for strict contour farming.



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

iii) **Buffer strip cropping:** Buffer strip cropping is practiced where uniform strip of crops are required to be laid out for smooth operations of the farm machinery.

Buffer strip of legumes, grasses and similar other crops are laid out between the contour strips as correction strips.

Buffer strips provide very good protection and effective control of soil erosion.