



SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution Coimbatore – 35

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DEPARTMENT OF AGRICULTURAL ENGINEERING

19AGE308

WATERSHED PLANNING AND MANAGEMENT





- **Forms of Water Erosion**

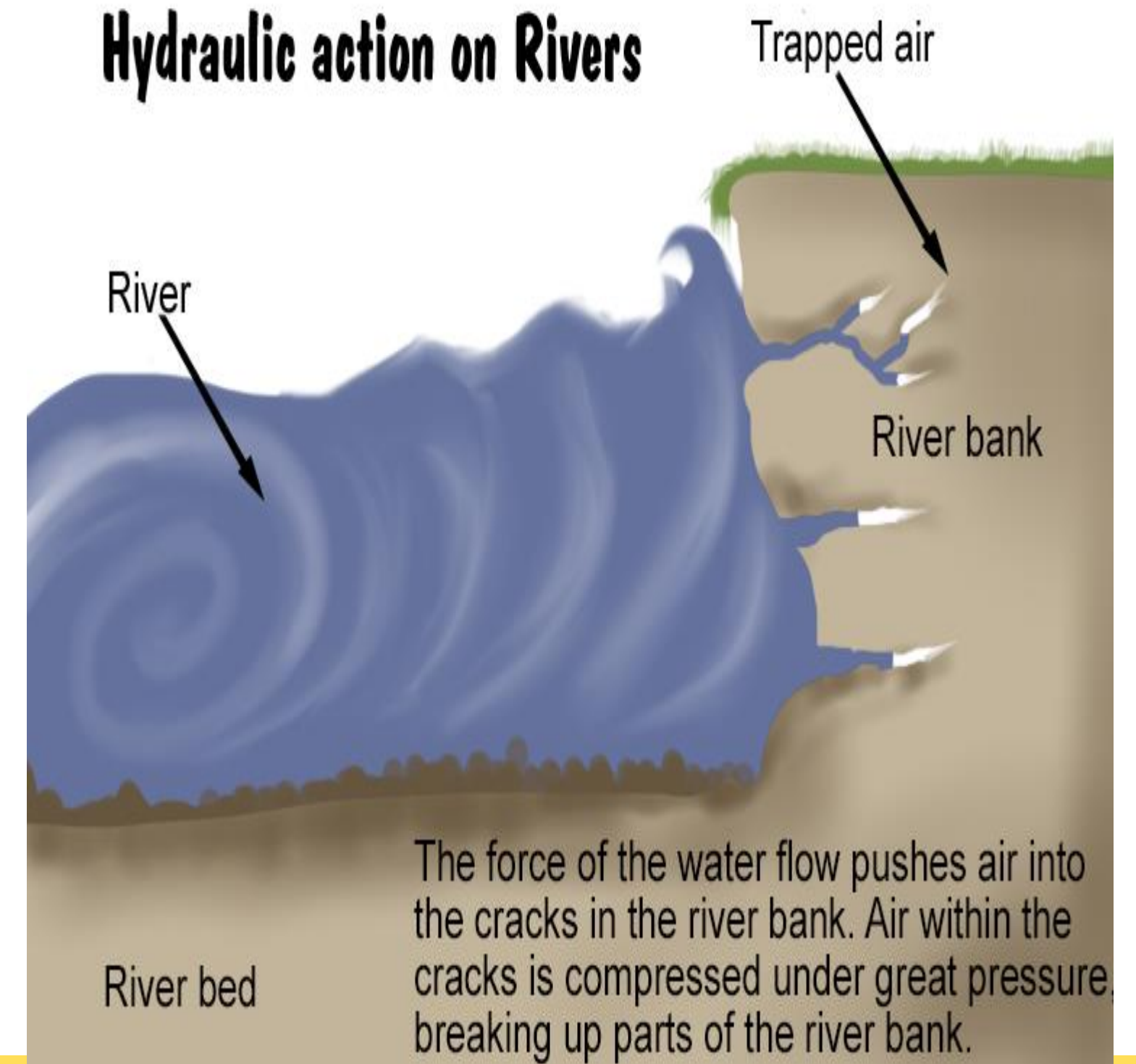


Hydraulic Action:

The hydraulic action takes place when water runs over the soil surface compressing the soil, as a result of which the air present in the voids exerts a pressure on the soil particles and this leads to the soil detachment.

The pressure exerted by the air voids is called hydraulic pressure.

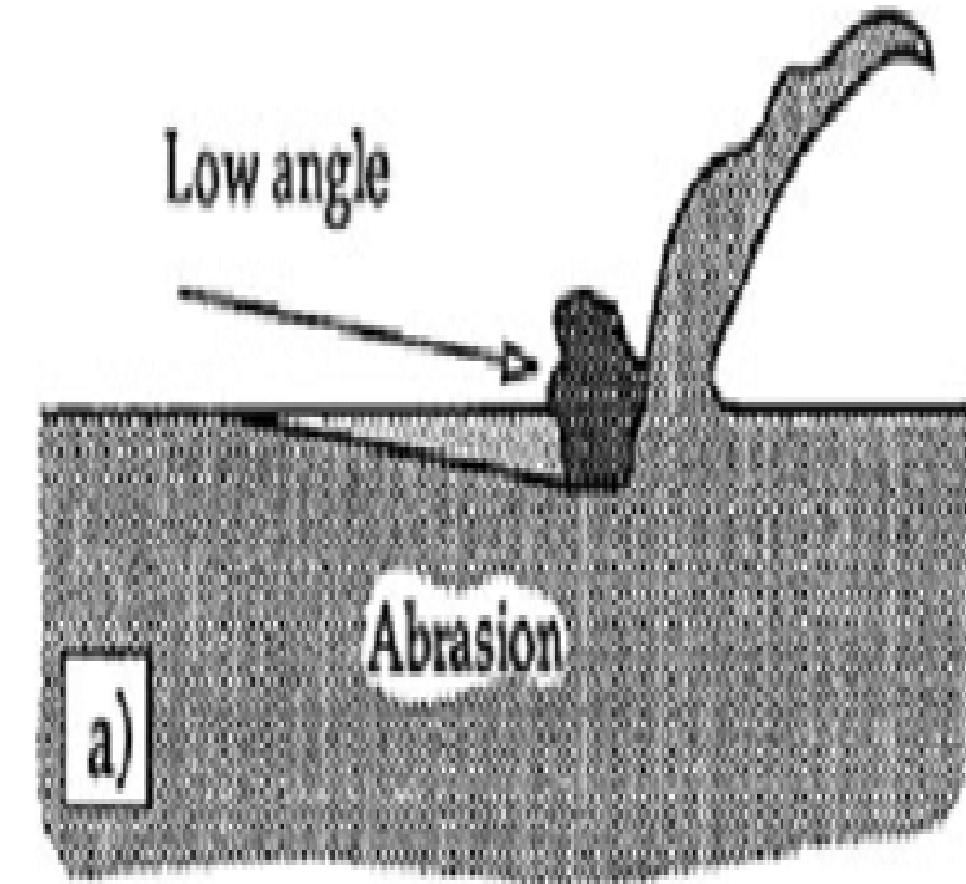
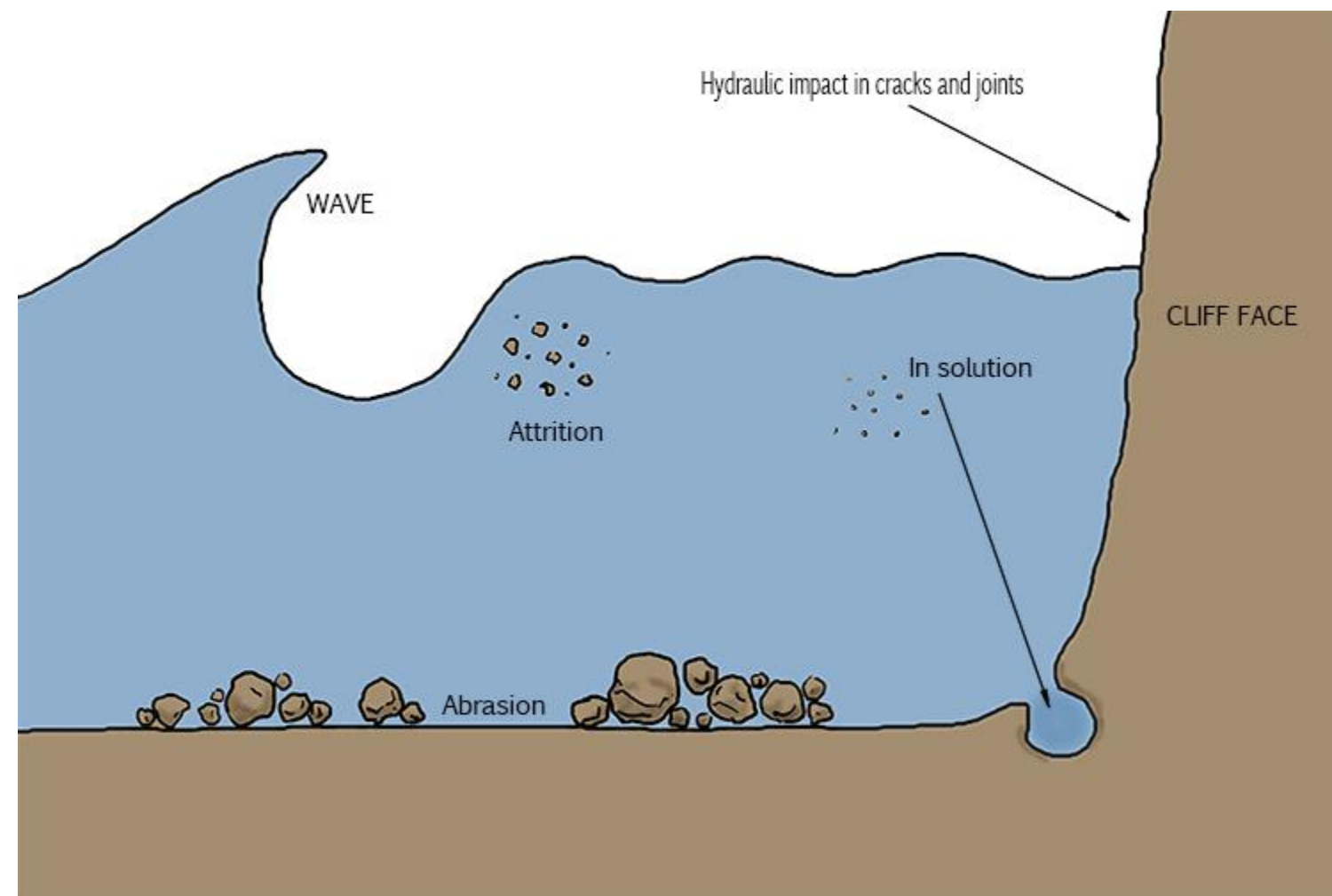
The soil particles so detached from their places, are scoured by the running water. The hydraulic action is more effective when the soil is in loose condition.





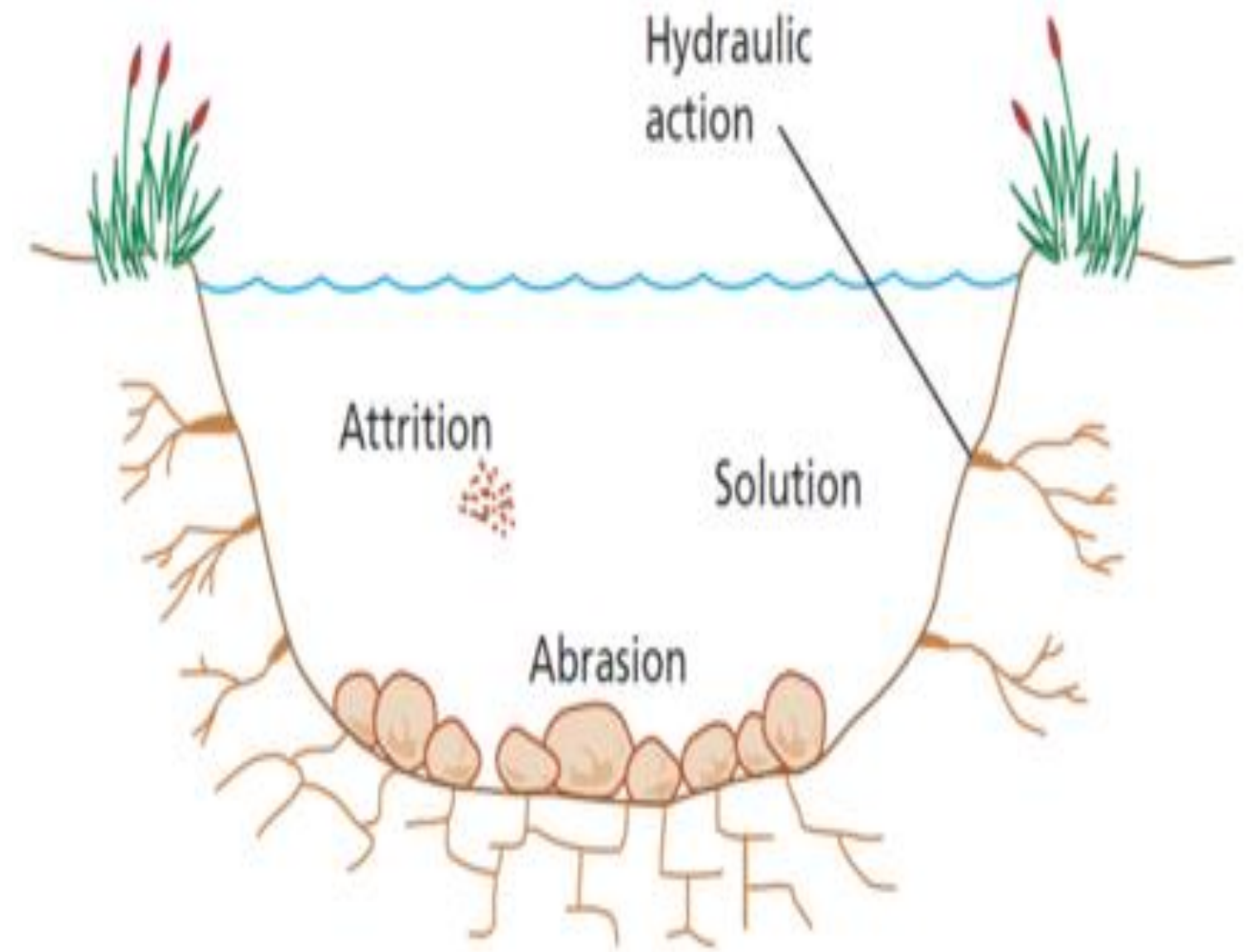
- **Abrasion:**

- Soil particles mixed with the running water create an abrasive power in the water which increases the capacity of flowing water to scour more soil particles. Due to this effect, larger soil particles are eroded by the flowing water.





- **Attrition:** This form includes mechanical breakdown of loads running along the moving water due to collision of particles with each other. The broken particles are moved along with the flow velocity, which generate abrasion effect on the bottom and banks of the water course. This effect pronounces the water erosion.





- **Solution:** This form is associated with the chemical action between running water and soil or country rocks. This type condition is observed in areas where existing rocks or soils are easily dissolved in the running water.





- **Transportation:** The process of soil transportation by running water is completed under the following forms:
 - 1) **Solution:** the water soluble contents present in the water are transported by the water in solution form.
 - 2) **Suspension:** it involves the transportation of finer soil particles, which are present in suspension form in the flowing water.
 - 3) **Saltation and Surface Creep:** it involves transportation of medium size soil particles that are not able to stand in suspension form, but are mixed in water and flow over the stream bed in the form of mud. The surface creep action is responsible for transporting the coarser soil particles.



- **Agronomical Measures of Water Erosion Control**

Contour Cropping

- Contour Cropping is a conservation farming method that is used on slopes to control soil losses due to water erosion.
- Contour cropping involves planting crops across the slope instead of up and down the slope .
- Use of contour cropping protects the valuable top soil by reducing the velocity of runoff water and inducing more infiltration.
- On long and smooth slope, contour cropping is more effective as the velocity of flow is high under such situation and contour cropping shortens the slope length to reduce the flow velocity.
- Contour cropping is most effective on slopes between 2 and 10 percent.



Contour Cropping





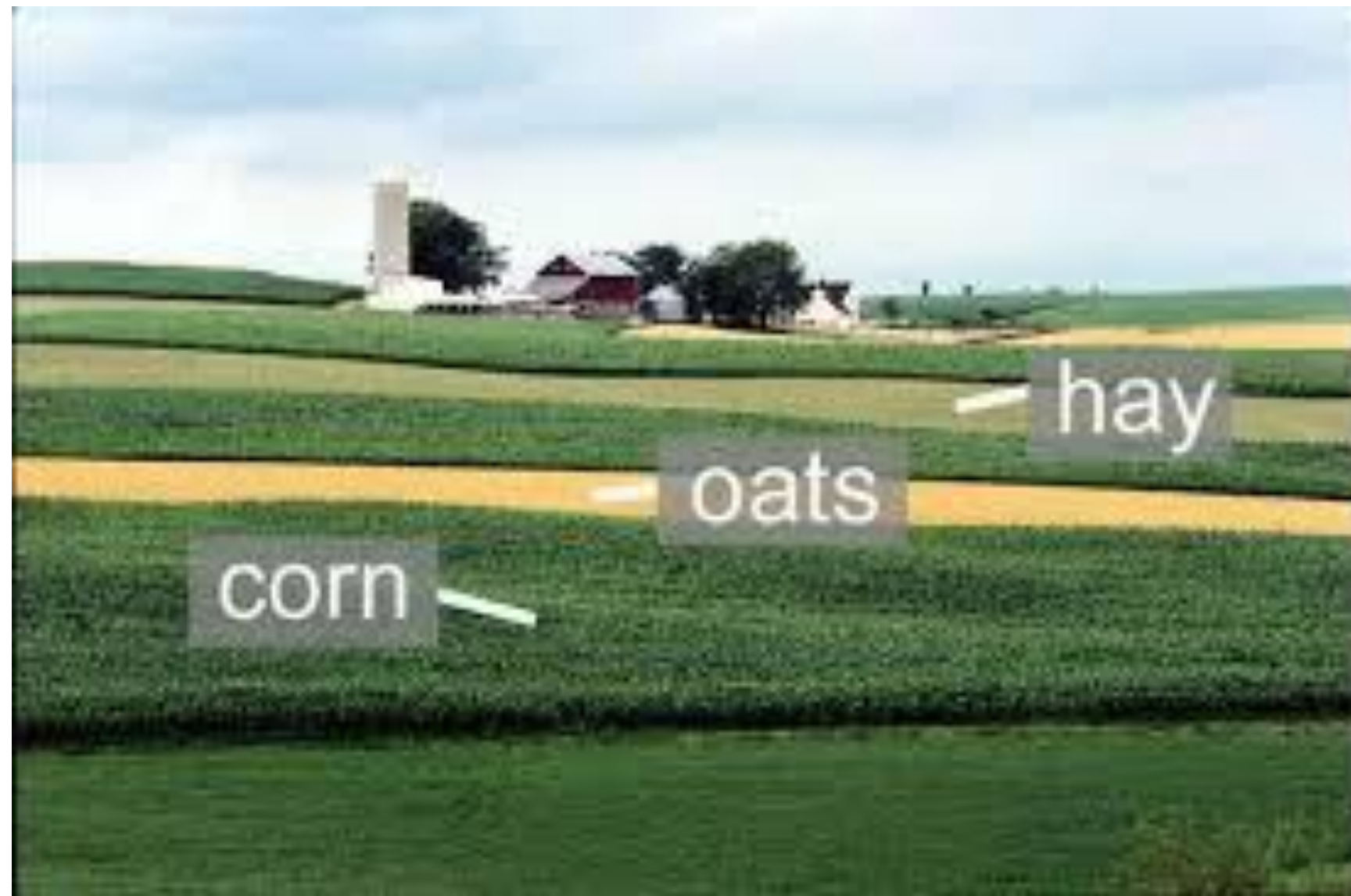
Strip Cropping



- 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.
- A crop rotation with a combination of intertilled and close growing crops, farmed on contours, provides food, fodder and conserves soil moisture.
- 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:



- **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.





- **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.





Multi-species riparian buffer strip model

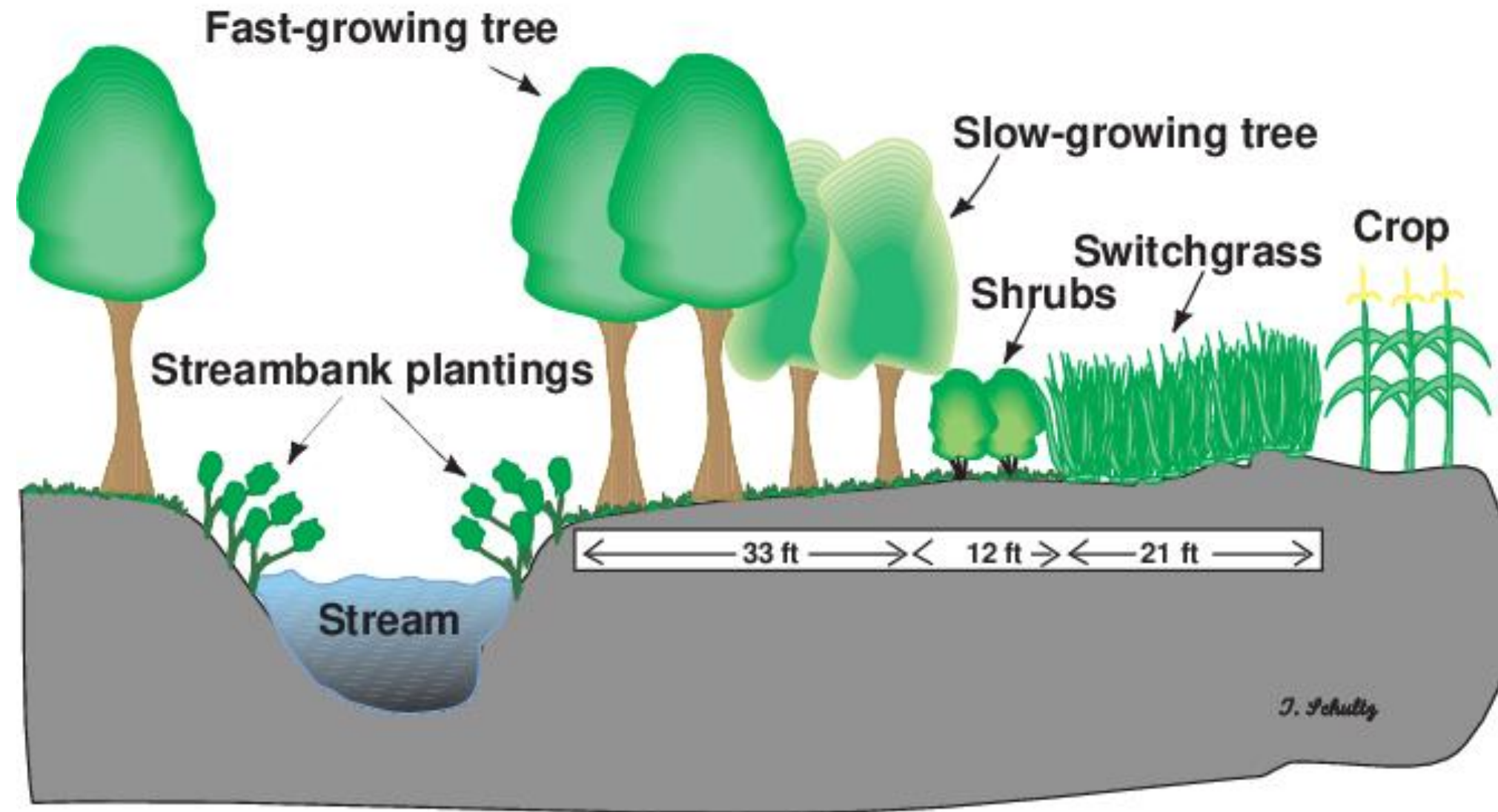
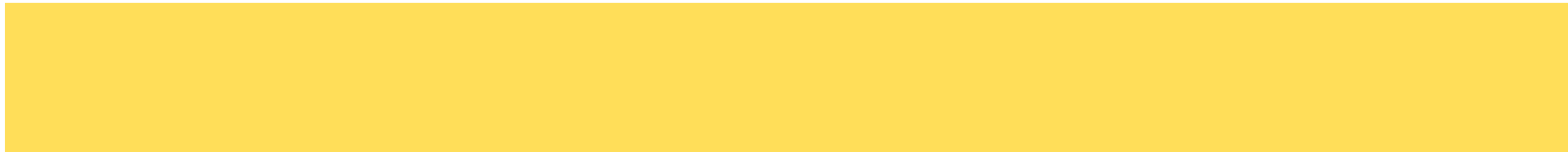


Figure 4 The actual benefits of riparian (wildlife) zone can be seen





Mulching



Mulches are used to minimize rain splash, reduce evaporation, control weeds, reduce temperature of soil in hot climates, and moderate the temperature to a level conducive to microbial activity.

Mulches help in breaking the energy of raindrops, prevent splash and dissipation of soil structure, obstruct the flow of runoff to reduce their velocity and prevent sheet and rill erosion .

They also help in improving the infiltration capacity by maintaining a conducive soil structure at the top surface of land.

