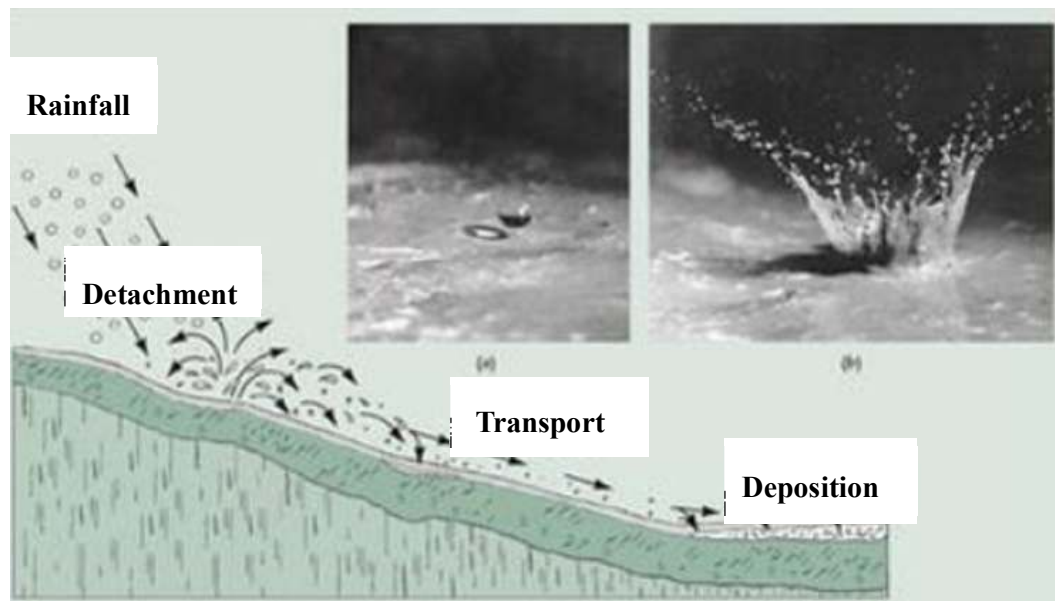


## Soil Erosion

Detachment and transportation of soil particles from the surface of the ground or slope is referred as erosion. Soil erosion induces changes in soil texture, loss of nutrients and frequent floods (Tripathi and Singh, 1993). Erosion causes an annual loss of 400 billion dollars to the world (Borrelli et al., 2017). The key factors that affect erosion are climate changes, soil properties, topography, surface condition and agricultural practices. Various models were developed by incorporating the above-mentioned factors to estimate the soil erosion.



Soil erosion phenomenon (Courtesy: ICAR-Indian Agricultural Statistics Research Institute)

## Estimation of Soil Loss

The revised universal soil loss equation (RUSLE) is usually adopted to estimate the soil loss due to erosion (after Pitro Rimoldi, 2016).

$$A = R \cdot K \cdot LS \cdot C \cdot P$$

A = estimated average soil loss (tons / acre·year)

R = erosive potential rainfall factor (runoff erosivity; foot·ton·inch / acre·hour·year)

K = soil erodibility factor (ton·acre·hours / hundred acre·foot·ton·inch)

L = slope length factor

S = slope steepness factor

LS – considered together

C = land / slope cover-management factor

P = conservation practice factor

## Erosion Control

The land management factor can be altered to reduce the erosion loss. Conventional land management methods such as terraces, wattles, tackifiers and geosynthetic nets are adopted to control the erosion. However, conventional methods are not economical, feasible and eco-friendly. Hence, application of vegetation is widely recognized as eco-friendly solution for erosion control. A supplementary system is required to control the erosion and protect the seeds during early plant establishment period. Natural fibre geotextiles are widely used ground management approach for such short term erosion control applications.



**Unprotected Slope**

Courtesy: GreenFix GrunFix



**Coir Application**



**Enhancement of  
vegetation growth**



**Slope with stones**



**Soil levelling**



**Coir Application**



**Vegetation growth**

## Role of CoE, IIT Madras

India is known for the large scale production of coconut and coir (Coir Board, MSME, India). Many people depend on coir industry for their livelihood in India. Coir geotextiles were found to control the erosion effectively. Coir geotextiles degrade gradually and produce supplementary nutrients which promote plant growth. Hence, application of coir geotextiles could be most sustainable solution for short term erosion control and establishment of vegetation. CoE for the applications of coir and other natural fibres, IIT madras conduct laboratory and field monitoring studies on efficacy of coir geotextiles for erosion control. These studies will be conducted to understand the role of coir fibre, soil and environmental parameters on the erosion control. The site specific guidelines would be developed based on the studies conducted by CoE, IIT Madras to adopt the coir geotextiles as an eco-friendly solution.