

Mid-Term Exam 2018-19

Q.1 What strip cropping and describe different types of strip cropping used control the soil erosion.

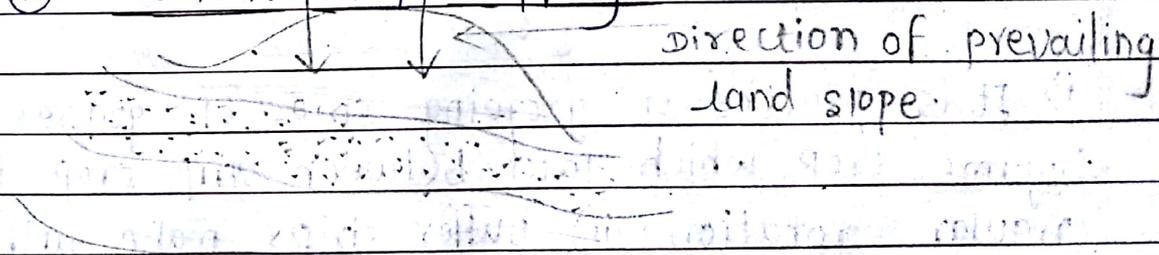
Strip cropping :-

It is the practice of growing alternate strips of erosion permitting crops (row crops such as maize, jowar, Bajra, cotton, etc) and erosion resisting crops (close growing crops such as green gram, black gram, groundnut) in the same field. Strip cropping is more effective than contouring.

There are four types of strip cropping :-

- ① contour strip cropping.
- ② Buffer strip cropping.
- ③ field strip cropping.
- ④ Wind strip cropping.

① contour strip cropping :-



① contour strip cropping

i) Crops are shown across the slope of land along the contours. Alternate strips of close growing and inter-tilled crops are grown.

ii) The combination contour strip cropping with terracing plays a role in conservation soil water.

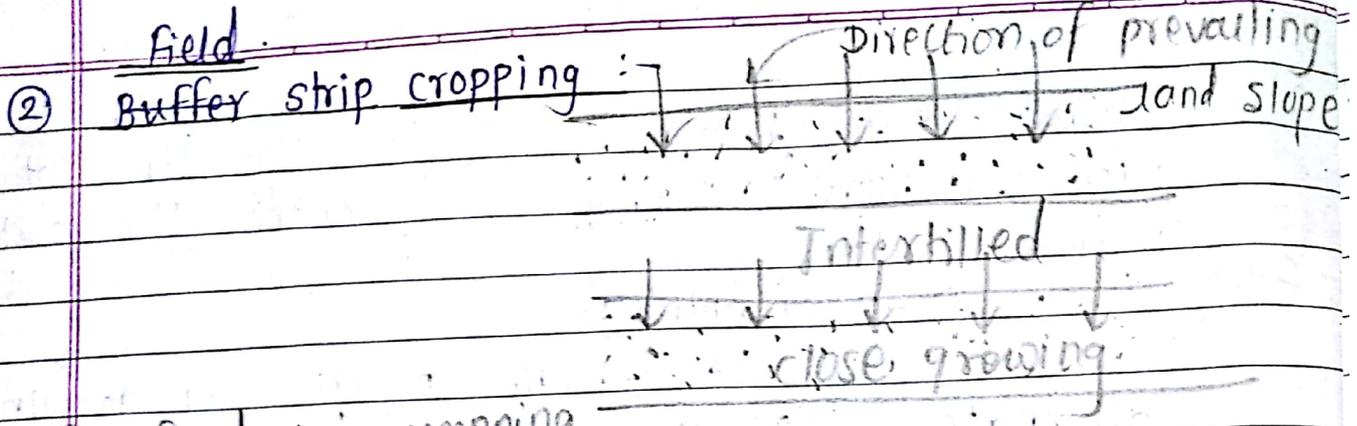


Fig 1) Field strip cropping.

i) It consists of uniform width and crops are sown across the slope. crops are not sown along contours. ii) crop strips have uniform width are laid in parallel. iii) they are used where the topography is either to irregular undulating.

Buffer.

3) field strip cropping :-

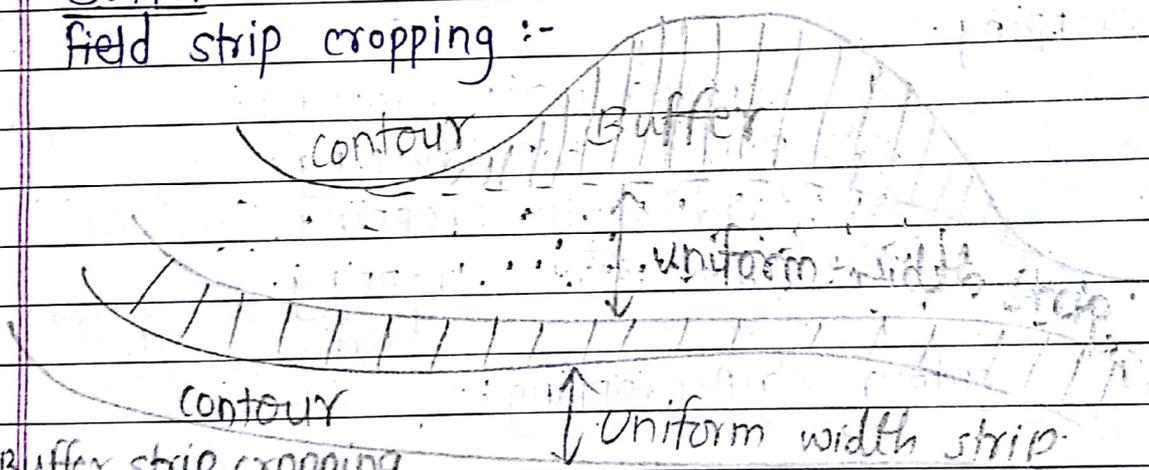


Fig Buffer strip cropping.

i) It is practice of growing strips of grasses or legume crop which laid between strip crop in regular rotation. ii) Buffer strips make uniform width between two contours. The buffer strips are usually 2 to 4 m wide are placed 10-20 m horizontal interval.

4) wind strip cropping :- i) In this system, the strip crops of uniform width are laid right angle to the direction of prevailing winds, without regards of the contour. ii) The main purpose is to control the wind erosion rather than water erosion.

Q.2 Give land use capability classification based on the land slope.

→ Land capability classification based on land slope-

class of land	percent slope	planning of land use and soil conservation measures (erosion controlling measures)
(A) land suitable for cultivation		
class-I	<u>0-1 %</u>	<ul style="list-style-type: none"> i) land is <u>very good</u> & levelled. ii) Any crop with proper crop rotation and green manuring to maintain soil fertility & soil structure, No risk of erosion. easy to work.
class II	<u>1-3 %</u>	<ul style="list-style-type: none"> i) land is <u>good</u>, gentle soil slope & overland flow require drainage facility ii) Risk of damage controlled by adopting tillage practices such as contour farming, strip cropping, contour bunding or terracing.
class-III	<u>3-5 %</u>	<ul style="list-style-type: none"> i) land is <u>moderately good</u>, moderate slope, more risk damage, poorly

requires drainage facilities
 iii) Intensive use of erosion control practices such as contour farming, contour strip cropping, terracing, contour bunding.

class - IV 5-8%
 i) Land is enough good occasional cropping steep slope, severe erosion pasture crop in 5-6 years rotation soil maintaining crop to be sown, soil erosion controlling measures.

(B) Land not suitable:

class V 8-12%
 i) wetness, stony or some permanent, obstruction land not suitable for cultivation
 ii) permanent pasture or forest with controlling grazing.

class VI 12-18%
 i) Land is not suitable for cultivation, shallow steep slopes used for forestry pasture grasses. grazing should be restricted

class - VII 18-25%
 i) unsuitable for cultivation of crops severe limitation for grazing or forestry draughty, or swampy land strict grazing or forest

class - VIII

> 25%

management must be applied. conservation measures.

i) very rough land, not suitable for wood land, or grazing, felling of trees. Generally suitable for wild life, recreation or watershed erosion.

Q.3 Enlist different types erosion by water. Explain Raindrop erosion in detail.

Water erosion :-

- 1) Raindrop erosion (Splash erosion)
- 2) sheet erosion.
- 3) Rill erosion.
- 4) Gully erosion.
- 5) stream bank erosion.

1) Raindrop erosion:

- i) It is also known as 'splash erosion'.
- ii) It is the first stage in the erosion process.
- iii) Raindrop erosion is soil detachment and transport of soil particles from soil mass caused by the impact of falling raindrop.
- iv) Raindrop is responsible for raindrop erosion.
- v) Raindrop falling on soil surface causes detachment of soil particles and then transported with the flowing water.
- vi) There are four factors to determine the

rate of raindrop erosion, they are:

- (a) climate; Rainfall, & Temperature.
- (b) soil; its resistance to dispersion and its infiltration rate.
- (c) Topography - steepness and length of slope.
- (d) plant cover - Living or dead vegetation, crops etc.

(vii) The diameter of raindrops depends on the intensity of rainfall, atmospheric pressure, Temperature and humidity, Raindrops strike the soil & loose the soil particles then flow in muddy water.

(viii) Soil detachability increases as the size of soil particles, increases soil transportability decreases with an increase in particle size.

* Results or damages caused by water erosion are:-

- ① Loss of production soil.
- ② Deposition of sand on productive field.
- ③ silting of lakes and reservoirs.
- ④ silting of drainage and irrigation channel.
- ⑤ lowering of water table.
- ⑥ fragmentation of land.

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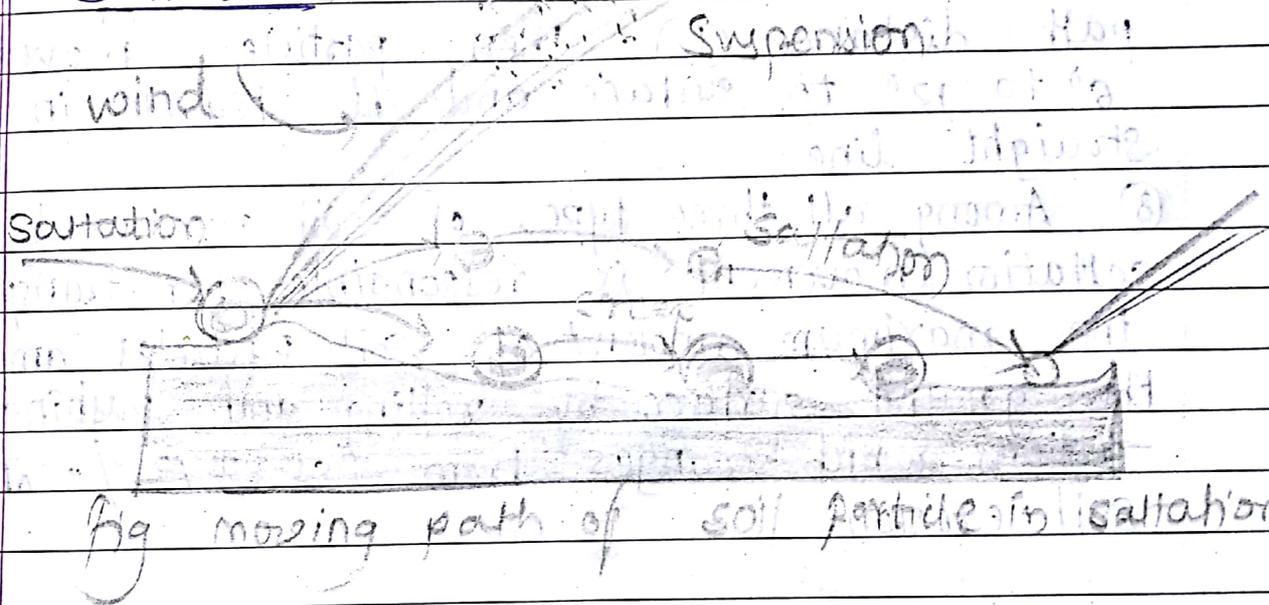
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Q.4 Define wind erosion. Explain saltation types of soil movement of wind erosion.

Wind erosion:- It is the process of detachment, transportation & deposition of soil particles by the action of winds.

Saltation:



① It is the most effective process in a soil movement. The major portion of the soil carried by wind is moved in a series of bounces or jumps called saltation.

② It is responsible mainly for the medium size of soil particles. The size range particles may be from 0.05mm to 0.5mm in diameter.

③ The most vulnerable range of particles is from 0.1 to 0.15mm diameter for this movement.

④ The maximum amount of particles are transported along the land surface by rolling and pushing in saltation movement.

⑤ From fig, it can be narrate that soil particles rise in the air upto some height and after some time they return back on the surface. probably

due to decrease in vertical movement, caused by gravity effect. At the same time the soil particles are also picked up by the wind current moving in lateral direction.

⑥ Initial and final velocity vectors are shown in above fig. As the soil particles leaves the surface it moves in a vertical direction.

⑦ This movement continues about $\frac{1}{5}$ to $\frac{1}{4}$ of path distance (L). Then particles moves down 6° to 12° to surface and it travels in a straight line.

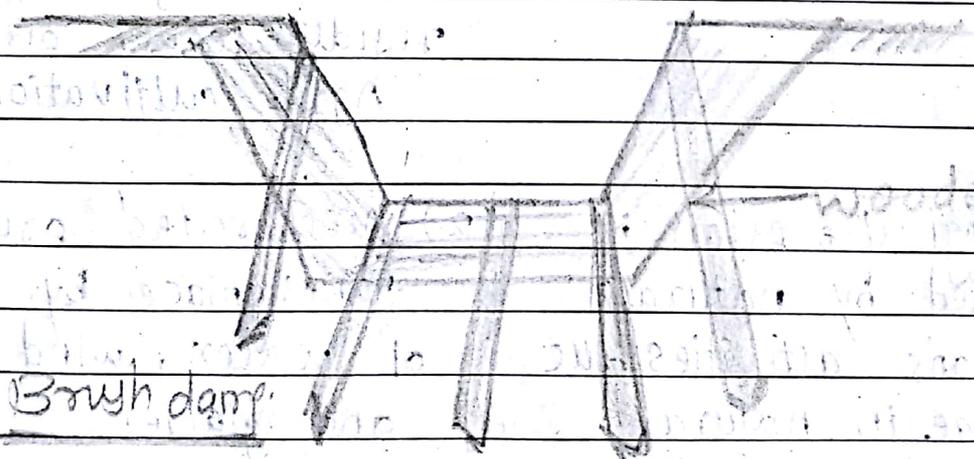
⑧ Among all three types of soil movement the saltation movement is responsible for transporting the maximum amount of soil particles among the ground surface by rolling and pushing actions. which ranges from 55 to 72% of total soil erosion.

Q.5 what are the various types of temporary gullies control structures and describe in brief Brush wood dam.

Temporary check dam :-

- (A) Brush wood dam :
 - 1) Single row post .
 - 2) Double row post .
- (B) semipermanent dam :
 - 1) Loose rock dam .
 - 2) Netting dam .
(woven wire)
 - 3) Long land pole dam .
 - 4) plank or slab dam .

Brush wood dam :



- A) single row post .
- B) double row post .

- 1) In the brush dams, locally available vegetation cuttings are used .
- 2) They are used for gullies with small drainage areas .

- 3) stakes, wire are used. The centre of dam is kept lower than the ends.
- 4) This the suited types of gullies is temporary types of gullies are used in - single row post in which are wooden post are used. Therefore, this is the temporary gully control structures.

Q6 Difference between Geological erosion & Accelerated erosion.

Geological erosion	Accelerated erosion.
1) Geological erosion will often occur after rock has been disintegrated or altered through weathering.	1) Accelerated erosion can be accelerated through the activities of human beings. The removal surface vegetation and residue cover occurs in Agril. cultivation.
2) Geological erosion is activated by naturals and man's activities due in change in natural cover and soil conditions.	2) Accelerated erosion takes place by the action of water, wind, gravity and glaciers.
3) Geological erosion is distinct from weathering in which chemical & physical process simply break down larger pieces of rock into smaller ones.	3) Accelerated erosion is generally caused by activities that disturb or expose the soil to the erosive forces of gravity Rainwater.

4) Geological erosion results only from the forces of nature.

4) Accelerated erosion results when the process is influenced by man.

5) Geological erosion is ~~not~~ not excess in accelerated erosion.

5) Accelerated erosion is excess in geological erosion.

6) Geological erosion is also known as natural and normal erosion.

6) Accelerated erosion is also known as soil erosion or erosion.

7) for e.g.
The geological erosion is longtime eroding process existing stream channels, valley etc.

7) for e.g.
sheet flow, stream flow, wave action, ground water flow, soil creep, rock creep, rock slide, etc.

8) This type of erosion contribute the formation of soils and their distribution on the earth surface.

8) This type of erosion activated by serious erosion deterioration and loss of soil by the nature & human beings.

fill in the blanks.

- 1) Geological erosion is also known as natural or normal erosion.
- 2) Formation is the first stage of gully development.
- 3) Raindrop erosion the first stage of in erosion process.
- 4) Gully is an advanced stage of Rill and erosion.
- 5) In splash erosion, the raindrop energy acts in the form of kinetic energy.
- 6) The safe limit of soil erosion 5 to 6 t/ha/year.

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ENGG -121 (1+1) = 2 Credits