RESOURCE MANAGEMENT IN RAINFED DRYLANDS

Natural Resource Degradation process: An Overview

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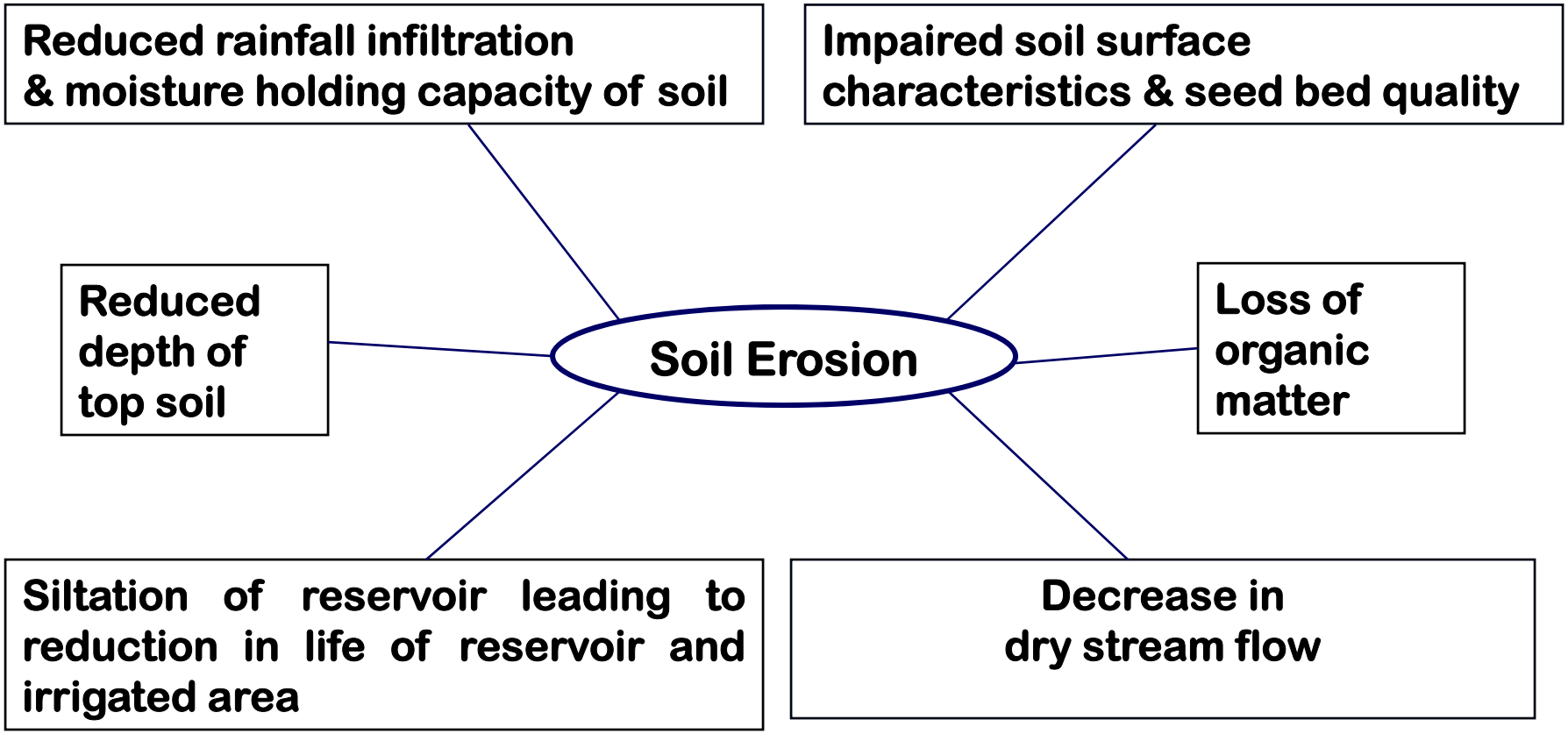


Soil degradation

Soil erosion

Raindrop impact & over land flow	Excessive tillage without protection

Salinization

Poor drainage	High evaporation

Depletion of soil nutrients

Intensive cropping using High Yielding Varieties	Repeated tillage – oxidation of organic matter

- Splash erosion results from the bombardment of the soil surface by rain drops.
- Rain drops fall at high intensity (behave as little bombs) on bare soil, displacing soil particles and destroying soil structure - splashed particles may rise as high as 0.6 m above the ground and move up to 1.5 m horizontally depending upon the intensity of rain drops.

Soil degradation **Water erosion** **Splash Erosion**

Splash erosion results in the formation of surface crusts which reduce infiltration resulting in the start of runoff

Soil degradation **Water erosion** **Sheet Erosion**

- **It is uniform removal of top soil in thin layer from the field often from the entire field more or less uniformly during every rain which produces runoff.**
- **In the initial stages of soil erosion, rain drops churn the top soil and along with runoff, the muddy water moves away from the field.**

Soil degradation

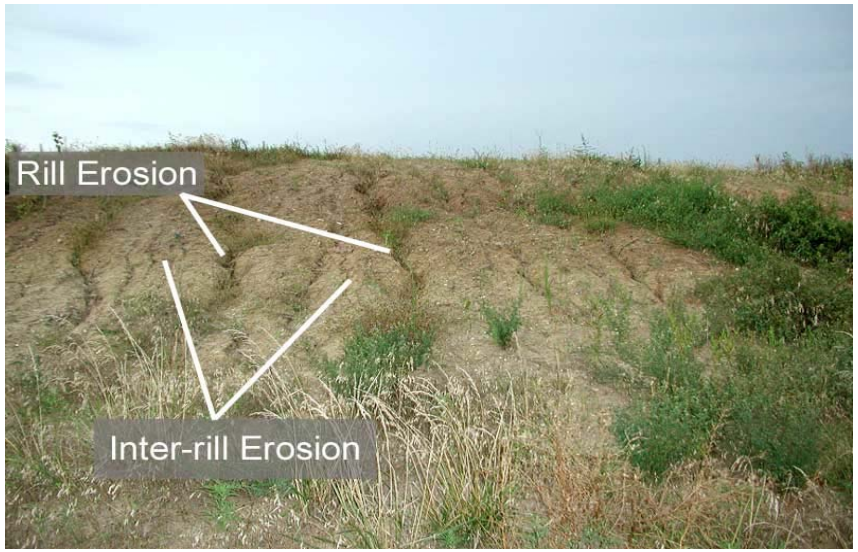
Water erosion

Sheet Erosion

It is least conspicuous - its existence, however can be detected by the muddy color of runoff from the fields.

Soil degradation **Water erosion** **Rill Erosion**

Removal of soil by concentrated water running through little streamlets, or head cuts

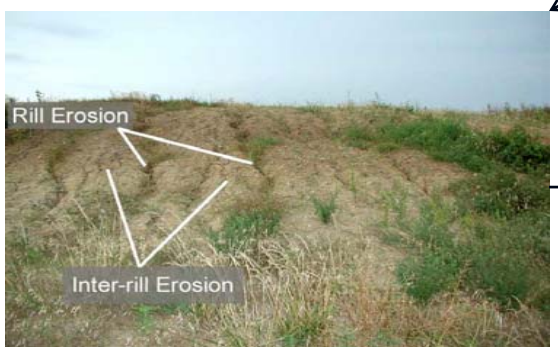


Soil degradation **Water erosion** **Gully Erosion**

Tiny grooves develop into wider and deeper channels which may assume huge size to form gullies - most spectacular evidences of destruction of soil and make the land unfit for cultivation

Splash Erosion

Sheet Erosion



Rill Erosion

Gully Erosion

Soil degradation

Over-exploitation of ground water

Water level has sunk to deeper levels, tapping of ground water has become costly and uneconomical.

Soil degradation — Vegetative cover

Important in reducing the impact of rain drops on soil, increasing infiltration and improving soil's water holding capacity. Otherwise high intensity rains cause accelerated erosion

Soil degradation – Do you know that?

- At present, the world is losing 5 to 7 Mha of arable land every year due to soil degradation
- About 177 Mha of land in India are degraded. Of this area,113 Mha are affected by water erosion, and 39 Mha by wind erosion
- The average soil loss in India is estimated to be 16.3 tons/ ha /year
- For every ton of grains, about 105 kg of nutrients are removed from the soil
- Soil erosion is estimated to cause a yield decline of 0.14 tons per ha per mm of soil loss

Soil degradation – Strategies for restoration

- Need based soil conservation measures both in arable and non – arable lands
- Afforestation of wastelands and development of grasslands
- Recharging of underground water through nala bunds, gully checks and percolation tanks
- Recycling of organic wastes to maintain health
- Practice of regenerative agriculture

- **Globally, over 15% of farm land is degraded due to human induced factors. The task is to increase the present level of food production with the decreased per capita availability of land for agricultural purposes.**
- **The only way to provide for the needs of the life system on earth would be to reverse the process of degradation and improve the productivity.**