

Erosion

Different forms of erosion

- Water erosion
- Wind erosion

What leads to increased erosion?

- High water run-off rates on medium to steep slopes (1) (2) (3)
- Heavy rains (1) (3) or inappropriate irrigation (4)
- Alkaline or sodic soils (1), poor (chemical) soil structure (1)
- Crusting and/or dispersion of soils (1)
- Drought (1)
- Soils bare of plant cover (2) (3) (4)
- Herbicide use (4) (5)
- Overgrazing, especially around watering points (1)
- Burning and consequently bare soils (4)
- Inadequate tillage practices (1) (4)

What can be done to prevent erosion?

- Minimal surface disturbance ensures that the soil is less prone to erosion (4), in other words, minimum to no-tillage techniques (1) (3) (4).
- Bare soils should be avoided as much as possible (3) (4), on the contrary, the soils should be covered with vegetation (ranging from cover crops, compost, mulch, via residues up to weeds) (1) (2) (3) (4).
- Note that herbicide use leads to bare soils with the known adverse effects on soil erosion. Therefore, if possible, minimize the use of herbicides and use mechanical weeding instead (2).
- In crops which take long to develop a closed canopy, intercropping with fast growing crops is beneficial to prevent erosion (3).
- Avoid overgrazing (1) (3) (5), e.g. by rotating grazing land, establishing a grazing management
- Restore degraded land (1)
- Increase soil organic matter and soil carbon (1) (4), e.g. by using cover crops, compost, or mulch, growing and incorporating green manures or applying biochar (1) and by conservation tillage (1).
- Agroforestry systems prevent the soils from erosion by a factor of more than 10 (1).
- Slow-down of peak discharge and thus water run-off (1) (2) (3), e.g. by contour farming (thus planting along the contour lines) (1) (2) (3), building terraces (1) (3), earth bunds (1), diversion ditches (1) (2), digging trenches (3), tied ridges (1) , enhancing soil surface rugosity, e.g. with clods (1) or mulching (1) (2) (3) (4) and by shorting the length of the slope (2) (3) .
- Creating grassed waterways to convey water safely off the slopes and reducing the speed (1).
- Planting trees or other vegetation along the hillside/slope and on riverbanks (1) (2) (3) (provides multiple benefits (except for light sensitive plants): introduction of organic matter in greater depth and possibly reduction of wind and water erosion, and stability of riverbanks (1).)
- If there are peatlands, they need to be protected (from drying out, overgrazing, wind erosion, etc.) as they themselves can act as a protection against soil erosion by buffering/absorbing excess water which slows down the peak discharge and reduces downstream flooding (1).

- Careful irrigation management which prevents salinization. Adoption of drip irrigation or micro irrigation systems (1)
- Introduce mulching or cover crops in your perennial crops (3). To prevent soil erosion, the mulching material should be slowly decomposing (low nitrogen content, high C/N ration) (3). But also weeds can be used as mulch layer, if they are cut before they seed (4).
- To sum up for water erosion: any measures which improve fast water infiltration into the soil reduces the surface run-off and consequent erosion. Such measures include many of the already mentioned measures, especially: a good physical and chemical soil structure, an active soil life, high organic matter content, vegetation, or mulch cover of the soil.

Specific measures against wind erosion:

- Optimize vegetation cover with drought-resistant plant species (1)
- avoid overgrazing to maintain vegetation quality (1)
- plant windbreaks at right angles to the prevailing winds (1)

References

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