

BioFacts

Prevention of Gully Erosion

Ehen, Ismayilli, Azerbaijan

In cooperation with the Ministry of Ecology and Natural Resources and the Ismayilli District Administration, the “Integrated Biodiversity Management, South Caucasus” programme, implemented by Gesellschaft für Internationale Zusammenarbeit (GIZ), introduced sustainable land use management in Ehen, Ismayilli. The objective of the interventions is to prevent erosion processes and to protect biodiversity (animals and plants).



Soil erosion

Soil erosion is a process driven by water runoff and wind. During heavy rainfalls or wind the upper layer of the soil is removed and transported to a new location. The result is a loss of fertile soils which reduces e.g. agricultural production. Soil erosion can be triggered by natural and/or human-induced factors such as, deforestation, overgrazing, off road driving or other activities which destroy the protective vegetation cover.

Gully erosion in Ehen

Gully erosion is the removal of soil by concentrated overland runoff. If gullies are not stabilized, they expand in all directions which possibly threatens nearby infrastructure. In Ehen, gully erosion is observed at the east side of the road from Lahij to Ehen. Paralleling the road, a severe gully has formed that started to destroy the road. The gully has a length of approximately 200 m at an elevation ranging from 1,350 m to 1,380 m above sea level. The average inclination of the riverbed is 12%.

Objective of the intervention along the gully

To further prevent that the gully expands, the water speed was reduced by building so called check dams from wood and gabions. On the left bank of the gully, willow fascines were installed to stabilize the slope and improve the vegetation cover. In addition, trees have been planted.



Measure 1: Establishment of willow fascines along the road

Willow fascines act as small terraces where soil can accumulate and they stabilize the wall through their root system. They also slow down and redirect the water flow.

Construction steps:

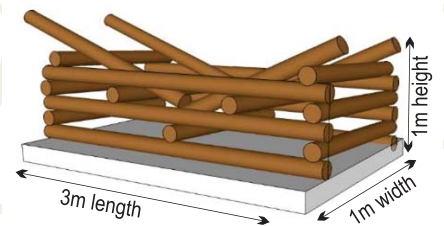
- Bundles of 20-30 thin willow branches (1-2 cm diameter, 2 m length) have to be formed.
- The bundles must be fixed with posts (5-10 cm diameter, 1 m length) into the ground (every 0.7 m).
- The fascines should be half-covered by soil to enable rooting of the fresh branches. The best time for construction is March or October, when willows are without leaves.

Measure 2: Wooden check dam

A wooden check dam is a man-made dam of wood and stones. It reduces water speed, which prevents the further expanding of the gully and it stabilizes the river bed. The cast of the dam is made with wooden poles. Once the construction is finalized, the dam is to be filled with stone layers. The design of the dam results in a concentrated water flow to the centre. This increases the resistance of the construction.

Required material and workforce for a 3 m³ (3 m x 1 m x 1 m) dam:

- Wood poles: 10 pcs of 3-meter length and 9 pcs of 1-meter length (with a diameter of 15-20 cm)
- 30 nails with 25 cm length (10 mm diameter) to fix the log to each other
- Labour: 9 man-days



Measure 3: Gabion check dams

A gabion check dam consists of mesh wire and stones, constructed perpendicular to the water flow. Gabion check dams allow water to pass, yet prevent that sediments and stones are transported by the water. They accumulate in front of the check dam.

The construction is based on a mesh wire basket to be filled with stones. To prevent that the gabion turns over it has to extend at least 1 m into the slopes on each side and 10 cm into the bottom of the gully bed.

Required material and workforce 4 m³ (4 m x 1 m x 1 m) dam

- Mesh wire: 1 m x 18 m
- 4 m³ of stone and 24 m arming steel (8 mm diameter)
- Labour: 9 man-days



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Measure 4: Planting of trees along the road

To support the stabilization of the road, trees have been planted.



The root system of the trees prevents the soil from moving and extracts water from deeper layers of the soil and evaporates it through the leaves. The trees were planted every two meters.