

# BioFacts

## Hazelnut Plantations

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 that destroy the protective vegetation cover.

### Preventing soil erosion with hazelnut shrubs

Hazelnut plantations have the potential to stop erosive processes and soil loss. The hazel shrubs can stabilize the soil by its root system and the above-ground biomass will reduce the impact of heavy rain by decreasing the speed and energy of raindrops. The leaves of the hazel are fast decaying. The litter layer and an emerging humus layer will reduce surface runoff and increase the water-holding capacity of the soil.



### Objectives of intervention

- Preventing soil erosion
- Improving the soil fertility
- Stabilizing the top surface of the ground
- Changing land use from pastures to orchards and meadows
- Creating an additional source of income
- Providing ecosystem services

### Measure 1: Site selection

The first step in the process of establishing hazelnut orchards is the selection of suitable sites. As the main objective is to stop soil erosion, it would be logically to choose sites that are already eroded or threatened by erosion. Examples of those sites are steep slopes, overgrazed pastures and landslides. Besides that, it is important to consider whether the physical and climatic circumstances are suitable for hazels. For example, the temperature should not drop below -8 °C and the soil should be at least 150 cm deep. The socio-economic criteria consider e.g. land ownership, laws and regulations, and potential land use conflicts.



### Measure 2: Planting

Before the seedlings can be planted, a suitable planting scheme has to be developed. This scheme includes tree density and spacing and takes into account the slope, aspect and dominant wind directions. The optimal planting density is up to 400 shrubs per hectare, with a spacing of 5m x 5m. The seedlings are planted in lines parallel to the contour of the slope. To prevent the disturbance of the seedlings by animals for at least two years, fences have to be put in place.

### Measure 3: Irrigation

The seedlings will need irrigation water to survive the dry summers in Ismayilli. Although ground water is available, the root system is not yet well developed at that time and will not reach the water. What irrigation system should be used depends on several conditions, e.g. size of the plantation area, number of seedlings, and access to water. If sites are small, the trees could be watered by hand with a bucket. Larger sites, as in Ismayilli, are suitable for drip irrigation systems. This system has high water use efficiency and automatically supplies the shrubs regularly with small drops of water. However, this system requires a large financial input and a lot of maintenance.



### Benefits

The development of a hazelnut plantation is a costly operation. Therefore, it is important to calculate both the costs and benefits of the plan in advance. This will show whether the plantation will be profitable or not. A cost-benefit analysis was executed for the plantations in Ismayilli. It turned out that the benefits of the plantation were about 5 times higher than the costs over a period of 15 years.

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