Figure 6: Russian Olive seedling with protection tube

Maintenance and protection

The planting site should be prepared in such a way that the water flow is guaranteed. Before planting, the site should be weeded, and after planting immediate watering is required. Young seedlings should be watered at least 2-4 times (in accordinance with weather conditions) per year with 5-10 litres each time (within the first two years). Experience shows that most plants are safe and completely self-sufficient after four years.

A fence should be built around the intended windbreak area to protect seedlings from the browsing by the livestock. Alternatively, individual protection shields (three rods wrapped in thorny twigs surrounding the seedlings) or protective (preferably bio-degradable) tubes can be used.

Benefits and possibilities

The rehabilitation of windbreaks is one of the most important technologies for increasing land productivity and biodiversity at various levels. It helps to protect the land from wind erosion, drought caused by wind and increases the diversity of habitats.

Planting windbreaks is a significant investment; it takes 5-10 years to increase crop productivity. However, 3-4 years after planting, the windbreaks do not require further investment in maintenance, but can provide value added (e.g., fruits, fencing materials, honey, fuelwood).

Re-establishing windbreaks will help to protect Shiraki valley from turning into steppes in the coming decades, and to adapt land management to mitigate climate change effects.

Next steps

It is important to create a legal basis and introduce some programmes to ensure the sustainability of windbreak rehabilitation. The following steps are recommended:

- Official approval of the new law on windbreaks to clarify responsibilities for planting, protecting and maintaining windbreaks, also as the basis for enforcing the zero burning policy;
- Initiation and development of a state programme to rehabilitate and protect windbreaks to ensure a degree of self-sufficiency in wheat production for national food security;
- Collection and utilization of straw (e.g. as bio fuel or for stables) to minimize organic burning material;
- Alternative plant and seed protection (e.g. by supporting biological predators) to avoid fires aiming at destroying pests;
- Raising awareness and introduction of further incentives for local farmers (e.g. support for utilizing straw etc.) to support the zero-burning policy;
- Provision of seedlings or seeds of trees and bushes that are well adapted to the specific climate conditions of East Georgia.

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Integrated Biodiversity Management, South Caucasus (IBiS)

Bio *Brief*

Rehabilitating windbreaks

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The Programme “Integrated Biodiversity Management, South Caucasus (IBiS)” was financed by the German Federal Ministry for Economic Cooperation and Development (BMZ). In Georgia, IBiS contributed to the development of the integrated technology to increase productivity and biodiversity at different levels through the rehabilitation of windbreaks.

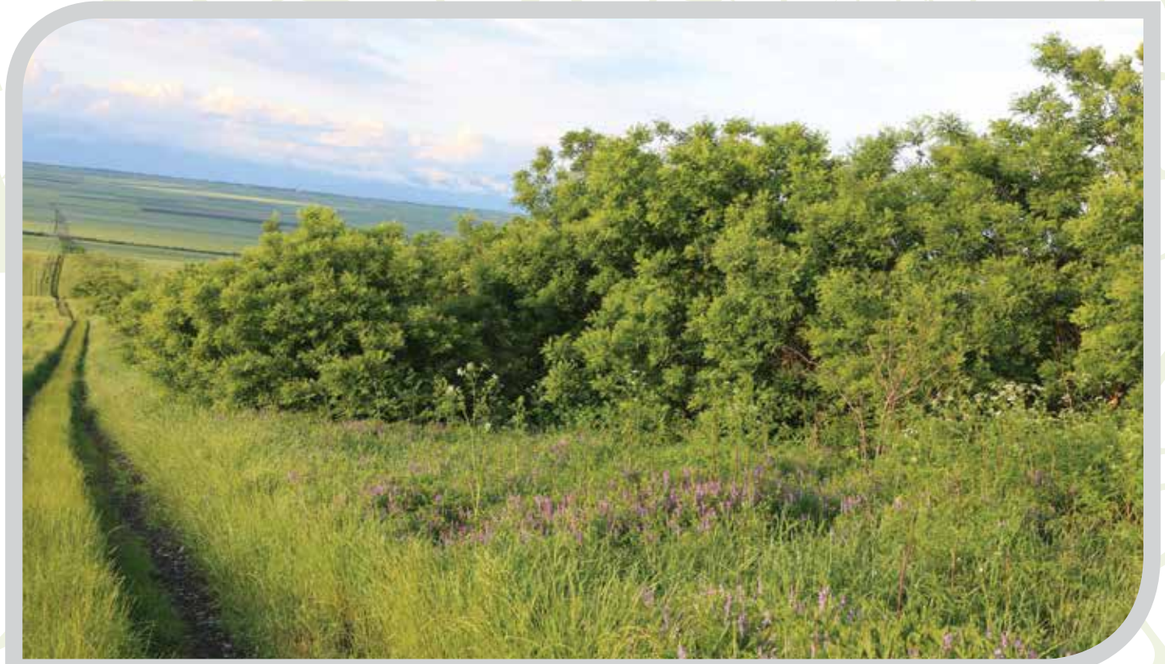

Figure 1: Intact windbreak in Georgia

Windbreaks for soil protection

Land and soils are an essential global goods and the basis for food security and many rural livelihoods. Windbreaks are a well-known measure against wind erosion. They consist of rows of trees and bushes on the edges of agricultural fields to protect the topsoil from strong winds. Windbreaks improve the micro-climate for crops growing in their shelter by reducing moisture loss. Windbreaks also provide shelter and habitats for a wide range of plants, pollinating insects, wildlife and birds, including predators of agricultural pests.

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Main threats to windbreaks

During the 1950 – 70s, around 1,800 km of tree windbreaks were planted in Shiraki. Today, more than 90% of them are destroyed either by illegal cuttings for firewood or by fire. Additional damage was caused by large-scale uncontrolled fires triggered by farmers burning harvest residues and shepherds burning pastures to facilitate the growth of new grass, and to clear land. The fires in the summers of 2015 and 2019 took a particularly large toll on windbreaks, burning an area of more than 35,000 hectares of arable land and adjacent windbreaks. Today, fire and grazing by migrating sheep and by local (cattle) herds pose the greatest threats to windbreaks.

Figure 2: Burning windbreak

Rehabilitating windbreaks

Species selection

Windbreaks were replanted in Shiraki valley to combat wind erosion. Local tree and shrub species well adapted to the regional conditions (climate, soil, etc.) are proposed for selection.

Trees for central row: Black Locust, Common Ash, Caucasian Hackberry, Field Elm, Eldar Pine.

Bushes for the outer rows: Almond, China Tree, Russian Olive, Pistachio, Wild Pear, Wild Apricot.

Figure 3: Pistachio seedlings in test windbreak

Preparation of seedlings

The seeds are prepared for planting in a nursery. Seedlings to be transported over long distances must be grown in special containers to ensure good root system development and minimise damage during transport. If they are grown near the planting site and the transport time is short, seedlings may also be bare-rooted.

A proven alternative is planting of wild seeds collected from drought resistant trees and bushes, such as Almond, Pistachio and Wild Apricot.

Figure 4: Containerized plants

Planting of seedlings

The planting scheme should be adapted to the local site conditions and the location, the length and the width of the windbreaks. The windbreak may consist of three to four rows of different tree and shrub species with a total width of 10 m and a distance of 400-500 m between them. While the middle row consists of large trees, the outer rows include small trees or shrubs. The distance between trees and shrubs is 2-3 m with 2-3 m between the rows in chess order. The intercropping of vegetables such as onions, garlic and potatoes in windbreaks can also show good results from the point of getting additional profit. In this case soil composition and climate conditions should be carefully considered.

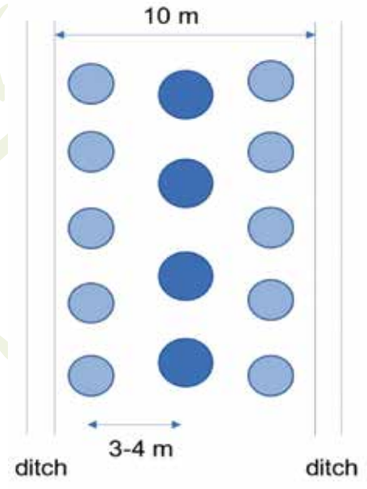

Figure 5: Planting scheme