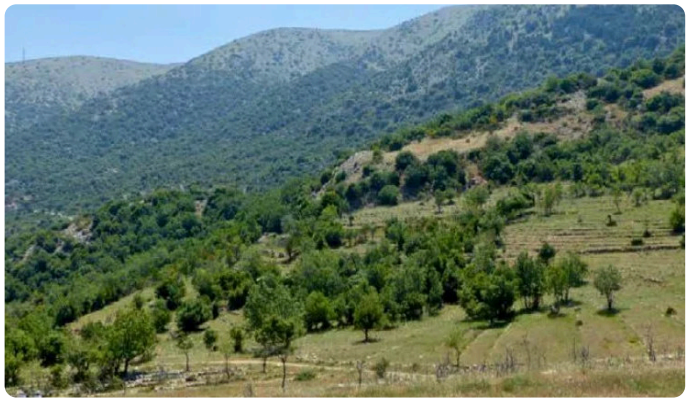
ResAlliance

Type of solution: Management Sector: Agroforestry, Forestry
Good practice(s): Soil management, Management alternatives

Forest landscape restoration in the Shouf Biosphere Reserve, Lebanon

Pilot actions integrating social needs and ecological restoration through a community-driven approach



Low mountain pasture, including abandoned agriculture terraces at the Shouf Biosphere Reserve.
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Land degradation in a sandstone quarry.
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/// Context ///

The landscape in the Shouf Biosphere Reserve has been under unsustainable use for many years. Deteriorating soils and lack of local employment led many households to migrate for work, sending remittances back home, leading to a sharp increase in mining and building houses. These challenges caused a decline in traditional cultural practices and customary governance around land use. In particular, farmers abandoned terraced farming which led to additional soil degradation and reduced water retention. The rise in mining and building houses further displaced agricultural and forest lands.
Since 2005, the management team of the reserve has taken proactive steps to engage stakeholders in planning and visioning. Their goal has been to align environmental, social and economic objectives to show that ecological and social benefits can be achieved simultaneously. They initiated pilot actions such as planting native trees, restoring abandoned terraces, constructing dry-stone walls and managing biomass. These efforts were based on the concept of forest and landscape restoration. All pilot actions were implemented on public and private lands, in areas that were most appropriate for each based on participatory mapping and planning. Overall, they were used to illustrate a proactive approach to environmental restoration while fostering local economic opportunities and advocating for supportive policy changes for future interventions.

/// Solution for a Resilient Future ///

Several pilot actions (2 to 6) aimed at planting native trees to achieve various ecological goals. Trees were planted in a staggered (quincunx) pattern at densities of 500-800 seedlings per hectare to enhance water retention and reduce runoff. Initial plantings in 2014 faced high mortality due to drought and predation, leading to replanting with improved seedlings in 2015. Survival rates after 3 years ranged from 75%-99%.

Pilot actions included:

Pilot 1 – Improving nursery management
Improved nursery management techniques led to stronger root systems in seedlings, minimizing the need for extra watering and reducing restoration costs. Improved methods were later adopted in national forest restoration plans.

Pilot 2 – Creating connectivity between isolated cedar stands
Oak acorns were planted to connect isolated cedar stands, aiming to enhance cedar growth by reducing solar radiation, improving soil and water retention, shielding young cedars from herbivores and serving as nurse logs. The use of plastic tubes protected the acorns from rodents; allowing good germination and growth with a survival rate of 70-80%.

Pilot 3 – Enhancing tree and shrub diversity in high mountain forest and facilitating upward climate-induced migration

High mountain forest habitats were reforested with diverse tree and shrub species to help forest ecosystem recovery. After 3 years, seedling survival rate was around 90%.

Pilot 4 – Establishing “tree islands” for applied nucleation in overgrazed areas
“Woodland islets” featuring diverse species were established in overgrazed areas, achieving a 95% survival rate. This pilot showed its positive impacts on biodiversity and local livelihoods through supporting ecological succession.

Pilot 5 – Restoring vegetation to abandoned quarry
Abandoned limestone quarry slopes were afforested. Both directly sown seeds and seedlings successfully controlled erosion. After 3 years, seedling survival rates were high (85-95%).

Pilot 6 – Restoring wetlands and diversifying wetland forests
This pilot was carried out in collaboration with private

vineyard and fruit tree crop owners near the Ammiq wetland. After 3 years, planted trees had a survival rate of > 95%, aided by controlling grazing and watering seedlings.

Pilot 7 – Restoring agriculture terracing
Abandoned agricultural terraces were restored to cultivate fruit, olives, nuts, herbs, aromatic plants and other local crops. The restoration process involved removing loose stones, digging drainage systems at the wall bases and rebuilding with reclaimed and new stones. Compost from waste biomass was added to the soil. Seedlings were planted while preserving natural forests and shrubs.

Pilot 8 – Reducing fire risks by managing forest biomass
Biomass reduction involved thinning and pruning Quercus calliprinos and Pinus brutia forests along high-risk roads to reduce fire risks. Positive results led to policy changes in fire prevention.

Pilot 9 – Alternative energy and waste management
This pilot included setting up a briquette production plant and composting factory to utilize waste biomass effectively; creating jobs, reducing pollution, and improving forest resilience.

Restoring forest land. Enhancing tree and shrub diversity.
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Dry stone wall restoration.
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/// Always Moving Forward ///

The Shouf Biosphere Reserve has made significant progress in integrating social needs with ecological restoration. Key steps for sustainability include:

1. Continued monitoring and innovation
   - Maintain ongoing monitoring of ecosystem recovery and survival rates
   - Assess connectivity and long-term impact of oak and cedar stands
   - Conduct periodic habitat quality assessments
   - Evaluate the benefits of restored vegetation and erosion control
   - Explore innovative monitoring and management solutions
2. Community engagement and capacity building
   - Strengthen partnerships with private landholders and local communities
   - Showcase successes to gain community support
   - Share lessons from pilot actions for future projects
   - Invest in training programs for sustainable practices
3. Scaling up successful practices
   - Expand techniques like nursery improvements and species-diverse woodlands
   - Explore partnerships for initiatives like briquette production and composting
   - Use successful outcomes to advocate for supportive policies
4. Long-term sustainability, climate change and resilience
   - Prioritize practices that enhance ecosystem resilience against climate change
   - Advocate for biomass management to reduce fire risks
   - Promote policies for long-term forest restoration and sustainable land use

Further information

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