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CASE STUDY

Climate-Resilient Woody Species Selection for Urban and Degraded Landscapes (Turkey)



Project full title: Enhancing Technical and Vocational Skills for Implementing Nature-Based Solutions (NbS) to Combat Land Degradation

Project acronym: NbS4LD

Project number: 2025-1-TR01-KA220-VET-000357096

Project activity: WP2 Developing Educational Resources on NbS for Combating Land Degradation

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1. INTRODUCTION

This case study has been analysed [The General Directorate of Combating Desertification and Erosion \(GDCDE\)](#). GDCDE is a Turkish central organization, operating under the Ministry of Environment, Urbanization and Climate Change. GDCDE carry out wide range of actions at national level in order to combat desertification, land degradation, erosion as well mitigate the consequences of natural disasters such as flood and landslides. GDCDE is also a national focal point organization to United Nations Convention to Combat Desertification (UNCCD), one of the internationally recognized environmental convention. GDCDE, in close cooperation with relevant institutions, fulfill the national and international obligations within the framework of the strategy and action plan to combat desertification for the period of 2024-2030. Over dacede, GDCDE has realized hundreds of projects aiming to combat desertification, land degradation and mitigate the natural disasters such as floods and landslides. Furthermore, GDCDE has very close cooperation with UNCCD, particularly under the Land Degradation Neutrality Target Setting Programme (LDN TSP). Türkiye is one of the advanced country in the progress of LDN TSP and sharing its expertise and experiences with other countries.

The Climate-Resilient Woody Species Selection Guidelines Initiative is a nationwide digital decision-support framework developed to support climate-resilient landscape planning and nature-based solutions in Türkiye. Covering all 81 provinces and 973 districts, the initiative provides locally adapted woody species recommendations based on ecological, climatic, and environmental conditions. The project was implemented in phases, beginning in 2024 with 22 drought- and desertification-sensitive provinces in Central and Southeastern Anatolia, followed by completion of the remaining 59 provinces in 2025. The guidelines provide a standardized reference for municipalities and practitioners to select climate-compatible species for urban and degraded landscapes. The initiative addresses challenges including urban expansion, vegetation degradation, soil compaction, biodiversity loss, and increasing climate stress. By promoting native and climate-resilient species, it supports improved ecosystem services, biodiversity conservation, carbon sequestration, and reduced land degradation.

Through cooperation between central institutions, municipalities, academia, and technical experts, the project strengthens institutional capacity and supports evidence-based planning. The approach provides a scalable framework for sustainable urban greening and ecosystem restoration across Türkiye.

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[Woody species identified in the guidelines for climate-resilient landscape implementation - Source: GDCDE]

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DOĞAL 5a



50 cm'ye kadar boy yapmaktadır.

Güneş alan yerleri tercih eder.

Kuru veya soğuk ve kuru ortamları tercih eder.

Geçirgen, kayalık ve taşlık alanlarda sığ topraklarda gelişebilir.

Soğuk iklimde sahip bölgelerde yetişebilir.

Fakir topraklarda yetişebilir ve soğuğa dayanıklıdır.

Kuraklığa dayanıklıdır.

Özellikle erozyon kontrol amacıyla karayolu kenarları ve diğer yeşil alanlarda değerlendirilebilir.

1. <https://www.researchgate.net/publication/314704040-Onobrychis-cornuta>
2. Akbayrak, U. (2018). Türkiye'de Doğal Ağaç ve Çalılar. Önemli Genel Bilgi ve İhtiyaçları. Ankara: GEDİK.

F1: <https://www.researchgate.net/publication/314704040-Onobrychis-cornuta>
F2: <https://www.researchgate.net/publication/314704040-Onobrychis-cornuta>
F3: <https://www.researchgate.net/publication/314704040-Onobrychis-cornuta>
F4: <https://www.researchgate.net/publication/314704040-Onobrychis-cornuta>

Genel görünüşü ve çiçek güzelliği ile öne çıkan erozyon kontrolü için ideal bir çalı...

Onobrychis cornuta

Kuşkaçıran

Kubbemsi ya da dikenli yastık formunda 60 cm çapında kümelerden oluşan, 50 cm yüksekliğinde çok dekoratif bir çalıdır. Yapraklar; 2-5 çift şeritsi ya da şeritsi-mızraklı yaprakçıklı olup her iki yüzü de ince tüylü veya yayılcı kısa-ince-zayıf tüylerle örtülüdür. Çiçekler mayıs-temmuz arasında açarlar. Çiçek kurulu 2-5 çiçeklidir. Taç yapraklar kırmızımsı mor, eflatun, beyaz veya pembe renkte, kanatları 10-14 mm, omurga 12-16 mm uzunluğundadır. Ovaryum tüysüz veya kısa-ince-zayıf tüylüdür. Meyve tüysüz veya kısa tüylü, yarım küre şeklinde, sıkıştırılmış ve sorguçlu olup 9-13 mm uzunluğundadır. Kuzey Kafkasya, Türkiye, Suriye, İran, Afganistan, Irak, Kırgızistan, Pakistan, Tacikistan ve Türkmenistan'da; 1200-3500 metre yükseltiler arasında; kayalık dağ zirveleri ve kuru kayalık subalpinlerde dağlık yamaçlarda yayılış gösterir. Türkiye'de ise Karadeniz, İç Batı Anadolu bölgesi ve Kütahya, Isparta, Antalya, Mersin, Yukarı Fırat, Erzurum-Kars, Yukarı Murat-Van, Hakkari'de doğal yayılış göstermektedir^(1,2).



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[Woody species identified in the guidelines for climate-resilient landscape implementation - Source: GDCDE]

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2. CONTEXT

2.1 LOCATION

Country: Turkey. Region: All the regions. Area: 81 cities.

2.3 LANDSCAPE TYPE

Grasslands. Urban Ecosystems.

2.4 LAND DEGRADATION CHALLENGE

Population pressure on land. Urban expansion.

2.5 BASELINE DATA

Land condition	• Site: urban and peri-urban areas exhibited limited vegetation diversity and poor soil structure. • Soil: soil compaction and reduced organic matter were common. • Vegetation cover: vegetation cover was fragmented and dominated by non-native or climate-incompatible species. • Erosion status: moderate to high erosion risk in exposed areas.
Environmental context	• Climate: increasing temperatures and prolonged drought periods due to climate change. • Hydrology: irregular precipitation patterns affecting plant survival. • Biodiversity: declining biodiversity in urban ecosystems. • Ecological pressures: high ecological pressure from urban expansion and infrastructure development.
Socioeconomic context	• Population density: increasing population density and urban heat island effects. • Livelihoods: limited awareness of climate-resilient landscaping practices. • Land management: dependence on conventional ornamental species with low ecological value. • Resource dependency: municipalities lacked standardized species selection criteria.
Policy and governance	• Institutional framework: alignment with Türkiye's climate change adaptation strategies and land degradation neutrality targets. Integration with national afforestation and erosion control policies.

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3. INTERVENTION

3.1 TIMEFRAME

In 2024, the first phase focused on 22 provinces located mainly in Central Anatolia and Southeastern Anatolia, which are among the regions most vulnerable to drought and desertification. In 2025, the remaining 59 provinces were completed, resulting in nationwide territorial coverage.

3.2 TYPE OF INTERVENTION

Climate-resilient afforestation and ecosystem restoration.

3.3 IMPLEMENTING ORGANISATIONS

Lead Institution: General Directorate of Combating Desertification and Erosion (ÇEM), Ministry of Environment, Urbanization and Climate Change

Partners:

- Local municipalities;
- Academic institutions (forestry and environmental sciences departments);
- Technical experts in climate change and land management.

3.4 FUNDING SOURCES

- Public funding from national government budget allocations;
- In-kind contributions from municipalities (implementation and maintenance);
- Potential integration with international climate finance mechanisms (e.g., EU Green Deal alignment, voluntary carbon markets).

3.5 IMPLEMENTATION ACTIONS AND MEASURES

- 1) Identification of climate-resilient woody species suitable for different ecological zones.
- 2) Compilation of scientific data (growth, drought tolerance, carbon sequestration potential).
- 3) Preparation and publication of provincial woody species guides.
- 4) Dissemination of information among all partners.

4. IMPACT

4.1 ENVIRONMENTAL IMPACT

☑ Increased vegetation cover or habitat restoration. ☑ Improved biodiversity (species richness, abundance, habitat quality). ☑ Reduced land degradation. ☑ Increased carbon sequestration or storage. ☑ Improved ecosystem services (e.g., pollination, flood regulation).

The intervention enhanced vegetation diversity by promoting native and climate-resilient

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species. It reduced soil erosion and improved soil structure through appropriate species selection. Carbon sequestration capacity increased due to the integration of high biomass woody species. Urban ecosystems benefited from improved microclimates and ecosystem services such as shading, air quality improvement, and water regulation.

4.2 COMMUNITY IMPACT

☑ Job creation or new livelihood opportunities. ☑ Strengthened community resilience. ☑ Increased local capacity or skills.

Municipal staff and practitioners improved their technical capacity in sustainable land management and species selection. The intervention contributed to climate adaptation in cities, reducing heat stress and improving living conditions. It also created opportunities in nursery production, landscaping, and maintenance sectors.

4.3 INSTITUTIONAL IMPACT

☑ Strengthened institutional coordination ☑ Strengthened land tenure or resource rights. ☑ Integration into local or national planning.

The initiative has a strong governance and capacity-building dimension, as it provides municipalities and local administrations with a standardized ecological planning reference tailored to regional climate conditions and ecosystem characteristics. The woody species guides have been integrated into municipal planning and landscaping practices. Institutional collaboration between central government, local authorities, and academia has been strengthened. The intervention supports evidence-based decision-making in urban greening policies.

4.4 SUSTAINABILITY OF THE RESULTS

☑ Integration into policies or development plans. ☑ Institutional support or partnerships. ☑ Local technical capacity for maintenance. ☑ Monitoring and adaptive management systems.

The intervention ensures long-term sustainability through policy integration and continuous institutional support. The guides provide a replicable framework for other regions. Monitoring systems allow adaptive management based on climate and ecological feedback.

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5. CONCLUSION

- **Community relevance:** fully
The intervention addresses urban climate stress, vegetation challenges, and the need for resilient landscape planning by providing practical species selection guidance for decision-makers and practitioners.
- **Technical effectiveness:** fully
The approach improves ecosystem resilience, biodiversity, and long-term vegetation performance by integrating climate adaptation, ecological suitability, and carbon sequestration criteria into species selection.
- **Economic efficiency:** mostly
The intervention supports cost-effective landscape management by promoting drought-resistant and low-maintenance species, reducing future maintenance and replacement costs.
- **Institutional support:** fully
Strong institutional involvement supports the development and application of the guidelines, enabling their integration into planning processes and environmental management policies.
- **Innovation:** mostly
The intervention combines climate data, ecological criteria, and carbon considerations in a science-based species selection framework for Nature-Based Solutions.
- **Replication & Scaling Potential:** fully
The guideline approach can be adapted and applied across different regions of Türkiye and similar climatic contexts through a standardized methodology.

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6. BIBLIOGRAPHY

- GDCDE, Drought Resilient Woody Species Guides Books Intervention. [Link](#).

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