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Project AGROFIG

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Deliverable D1.1 *State-of-the-art Report on Agroforestry - Partners' report summary*

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1. Short Introduction

The four national reports examine agroforestry as both a historic Mediterranean land-use tradition and a modern response to climate, biodiversity, soil and rural-development challenges. Across Italy, Spain, Türkiye and Tunisia, agroforestry refers to the deliberate integration of trees with crops and/or livestock in the same management unit. The reports show that this integration is not new: it is rooted in traditional polycultures, silvopastoral landscapes, oasis systems, permanent crop orchards and smallholder mixed farming. What is new is the policy and scientific recognition of agroforestry as a strategic tool for sustainable agricultural transition.

The AGROFIG focus gives particular attention to fig-based agroforestry, but each national report places figs within a wider landscape of tree-crop-livestock systems. Italy and Spain present relatively mature European agroforestry contexts, supported by Common Agricultural Policy instruments, research networks and Living Labs. Türkiye and Tunisia show very strong traditional knowledge and high bioclimatic diversity, but also more pronounced institutional fragmentation and weaker formal policy integration. In all four countries, the main opportunity is to convert existing local practices into technically supported, economically viable and climate-resilient systems.

Table 1. Country Overview of Agroforestry Identity and AGROFIG Relevance

Country	Core agroforestry identity	Main systems	Key policy / institutional issue	AGROFIG relevance
Italy	Historic mixed polycultures and renewed EU-supported agroforestry.	Olive-based systems, silvoarable designs, Sardinian silvopastoral systems, fig-based models.	Regional fragmentation and partial CAP implementation.	Fig-based diversification in Tuscany, Calabria, Campania and Puglia.
Spain	Largest agroforestry area in Europe, strongly associated with dehesa systems.	Dehesa, Mediterranean permanent crops, dryland systems, mountain silvopastoral systems.	Need to regenerate ageing tree systems and improve profitability.	Fig orchards with cover crops, grazing and mixed crop associations in Extremadura and Mediterranean areas.
Türkiye	Highly diverse Anatolian mosaic from humid Black Sea to semi-arid steppes.	Home gardens, olive-fig-vineyard systems, shelterbelts, pistachio systems, silvopastoral systems.	Agriculture and forestry remain institutionally separated.	Aegean fig orchards have high potential for future integrated systems.
Tunisia	North African agroforestry shaped by water scarcity, desertification gradients and oasis traditions.	Olive-fig systems, oases, silvopastoral forests, intercropped fruit systems.	Administrative silos between forest and agricultural institutions.	Mountain fig and olive systems can support resilience and territorial value chains.

2. Italy National Report: Summary

Italy is presented as one of Europe's leading agroforestry countries, with an estimated 1.4 million hectares of agroforestry land and a long history of integrated farming. The report stresses that Italian agroforestry is not an imported innovation but a continuation of older systems such as coltura promiscua, piantata and

alberata, where vines, fruit trees, cereals and livestock were managed together. These systems declined sharply after the Second World War as mechanisation, land consolidation and specialised monocultures became dominant. However, remnants survive in central and southern regions and are now being reinterpreted as models for resilient land management.

The report uses a mixed methodology combining statistical sources, policy documents, scientific literature and stakeholder evidence from the AgroFig Living Lab in Tuscany. This approach allows Italy to be analysed not only through land-use statistics but also through farmers' experiences, regional innovation networks and policy instruments. The evidence base is relatively strong for northern and central silvoarable systems and for Sardinian silvopastoral systems, but weaker for enterprise-level economics, long-term monitoring and traditional southern polycultures.

Agroforestry distribution is highly regional. In northern Italy, Po Valley systems integrate poplar, walnut and other timber species with cereals or forage crops, while Alpine areas include larch wood pastures. In central Italy, olive-based agroforestry and mixed systems are particularly important, especially in Tuscany, Umbria and Lazio. These systems combine oil production, cover crops, grazing and biodiversity functions. In southern Italy and the islands, agroforestry is more strongly linked to traditional Mediterranean landscapes. Sardinia is especially important, with extensive oak-based silvopastoral systems combining cork oak, holm oak and downy oak with sheep and cattle grazing across roughly 400,000 hectares.

The report distinguishes traditional systems, modern systems and emerging innovations. Traditional systems include Sardinian oak woodlands, mountain chestnut and larch pastures, olive-based polycultures and historic mixed-crop landscapes. Modern systems include silvoarable designs with walnut, poplar, cherry or other timber species combined with annual crops. Emerging systems include polycyclic arboriculture, short-rotation forestry and fig-based agroforestry models. The Italian fig focus is associated especially with Ficus carica, including cv. Dottato, integrated with cereals, legumes or forage crops in Tuscany and southern regions.

Economically, Italian agroforestry creates value through product differentiation, direct marketing, short supply chains, quality labels, ecosystem services and potential agro-tourism or carbon-related revenues. Olive oil, wine, figs, livestock products, cork, timber and non-wood forest products can be combined within multifunctional farm strategies. However, market development remains uneven. The report identifies structural barriers such as fragmented supply chains, limited consumer awareness of agroforestry-specific value, high labour needs, scarce farm-scale profitability data and limited advisory support.

Governance is both an opportunity and a constraint. Italy benefits from the CAP, regional rural-development instruments, European research networks and active actors such as the Italian Agroforestry Association. Yet implementation remains fragmented because agroforestry support is shaped by regional choices and often constrained by administrative definitions of agricultural and forest land. The report recommends clearer policy recognition, better advisory services, improved monitoring tools, stronger Living Labs, farmer training, targeted financial incentives and the development of fig-based value chains. Overall, Italy combines strong historical legitimacy, good scientific capacity and promising innovation, but needs more coherent institutional and market support.

3. Spain National Report: Summary

Spain is described as one of the most important agroforestry countries in Europe. With approximately 5.6 million hectares of agroforestry systems, it has the largest absolute agroforestry area among European countries. The Spanish report frames agroforestry as both an inherited Mediterranean practice and a modern sustainability strategy. For centuries, Spanish rural landscapes have combined trees, crops, pastures and livestock to cope with poor soils, drought, irregular rainfall and climatic variability. Formal recognition as a scientific and policy field is recent, but the practice itself is deeply embedded in rural land management.

The historical evolution follows four broad phases: traditional mixed systems before agroforestry was formally named; transformation from the nineteenth to mid-twentieth century through land-use change and production specialisation; post-1950s intensification, mechanisation and rural depopulation; and renewed interest after the 1990s and especially after 2010. This renewed interest is linked to climate adaptation, biodiversity, carbon sequestration, soil protection and rural development. Spain's CAP Strategic Plan 2023-2027 and National Climate Change Adaptation Plan 2021-2030 provide a policy context for agroforestry adoption.

Spain's agroforestry geography is diverse. In the humid north, systems include chestnut-based agroforestry, silvopastoral systems, mixed farms with fruit trees and livestock grazing under tree cover. In south-western Mediterranean Spain, the dehesa is the emblematic system. It is an agrosilvopastoral landscape dominated by holm oak and cork oak, with native pastures, crops and extensive livestock such as Iberian pigs, sheep and cattle. It produces acorns, cork, firewood, hunting resources and high-value livestock products while supporting biodiversity, carbon storage and fire-risk reduction. However, dehesas face ageing trees, poor regeneration, drought vulnerability and profitability constraints.

Mediterranean permanent crop landscapes are the second major agroforestry context. Olive, almond, carob, fruit tree and fig orchards occur across Andalusia, Extremadura, Castilla-La Mancha, Murcia, Valencia, Catalonia and the Balearic Islands. Traditional grazing and intercropping have declined in some areas, but new agroforestry approaches are emerging through cover crops, controlled grazing, legumes, cereals, hedgerows and scattered trees. Their main purposes are erosion control, improved organic matter, water infiltration, support for pollinators and natural enemies, and income diversification.

The AGROFIG Living Lab gives special attention to fig-based systems in Extremadura and other Mediterranean territories. Fig orchards may be combined with cover crops, grazing or associated annual crops, particularly in rainfed and low-input contexts. The Living Lab identified productive environments where figs coexist with cherry, olive, stone fruits, tomato, berries, chestnut, almond, pistachio, vineyard, tobacco, pepper, maize and blueberry. The report stresses that designs must be adapted to rainfall, soil depth, irrigation, mechanisation, labour availability and water competition between trees and associated vegetation.

The Spanish value chain is strengthened by territorial identity and quality labels. Dehesa products, Iberian pork, cork, olive oil, figs and other Mediterranean products can benefit from origin-linked valorisation. Stakeholders include farmers, livestock holders, cooperatives, processors, technical advisors, research institutions and policy actors. The main bottlenecks are technical knowledge gaps, limited profitability, weak tree regeneration, water scarcity, drought, labour costs and insufficient incentives for long-term tree management. Strategic recommendations focus on farmer training, Living Lab continuity, demonstration

farms, stronger policy alignment, adapted designs for fig-based systems, improved ecosystem-service valuation and better integration between agricultural profitability and landscape conservation.

4. Türkiye National Report: Summary

The Türkiye report presents agroforestry as a continuation of long-established Anatolian production traditions. Although the scientific framing of agroforestry is relatively recent, rural communities have long integrated trees, crops, livestock and forest resources to diversify income, improve food security and reduce environmental risks. Türkiye's geographic position between Europe, Asia and the Mediterranean creates exceptional ecological diversity, from the humid Black Sea to semi-arid Central Anatolia and Mediterranean coastal zones. As a result, the country cannot be represented by one agroforestry model; it contains a broad mosaic of orchards, home gardens, shelterbelts, forest-edge farming and silvopastoral landscapes.

The historical evolution is divided into traditional pre-industrial systems, agricultural modernisation and sectoral separation from the 1950s to the 1980s, renewed environmental awareness from the 1990s to the 2010s, and contemporary climate-adaptation approaches since 2010. Traditional examples include olive-cereal systems in the Aegean and Mediterranean regions, pistachio-based systems in Southeastern Anatolia, walnut and chestnut systems in northern Türkiye, home gardens in the Eastern Black Sea Region and forest-margin grazing. Modern concerns such as soil erosion, desertification, drought, wildfire risk, water scarcity and rural decline have increased interest in agroforestry as a multifunctional land-management strategy.

The report organises Türkiye into seven bioclimatic regions. The Black Sea Region is humid and forest-based, with multi-layered home gardens combining fruit trees, timber species, vegetables, medicinal plants, tea, fodder and ornamentals. It also includes hazelnut, chestnut, linden, tea-based and forest-margin silvopastoral systems. The Marmara Region includes walnut orchards with annual crops, chestnut systems, vineyards with scattered trees, boundary plantations and shelterbelts. The Aegean Region is central for AGROFIG because it contains economically important olive, fig and vineyard landscapes. These systems may combine olives, cereals, legumes, figs, cover crops, vines, nuts and occasional livestock grazing.

The Mediterranean Region contains permanent crop systems and silvopastoral landscapes. Central Anatolia is semi-arid, where agroforestry potential is linked to shelterbelts, windbreaks, drought-resistant species and erosion control. Eastern Anatolia contains mountain silvopastoral systems, while Southeastern Anatolia includes dryland agroforestry with species such as pistachio and other drought-tolerant trees. Across regions, agroforestry provides microclimate regulation, erosion control, improved water infiltration, biodiversity conservation, household income diversification, carbon sequestration and more stable production under climate stress.

Value-chain opportunities are tied to Türkiye's strong tree-crop sectors, including olives, figs, grapes, chestnuts, walnuts, hazelnuts, pistachios, honey and medicinal products. The Aegean Region is especially important because Türkiye is globally significant in dried fig production. The report notes that fig-based agroforestry is not yet widely practiced as a formal model, but it has strong future potential through integrated orchards, cover crops and climate-resilient diversification. Quality labels, territorial identity and short chains may help valorise agroforestry products, but stronger coordination is needed

between producers, cooperatives, processors, advisors and institutions.

Governance is the main weakness. Agriculture and forestry have historically evolved as separate sectors, creating institutional bottlenecks for integrated tree-crop-livestock systems. The report calls for clearer legal recognition, stronger cooperation between ministries and local authorities, pilot projects, technical guidelines, farmer training, economic incentives and monitoring of carbon, hydrology and biodiversity benefits. Strategic objectives for 2025-2035 include scaling region-specific agroforestry, improving research and innovation, building capacity, supporting climate adaptation and creating market mechanisms that reward ecosystem services. Türkiye's main strength is its ecological and productive diversity; its main challenge is converting dispersed traditional practices into coherent national agroforestry policy.

Türkiye: Key Regional Patterns

Table 2. Dominant Agroforestry Patterns by Turkish Region

Region	Dominant agroforestry patterns	Main functions
Black Sea	Home gardens, hazelnut, chestnut, linden and tea-based systems.	Food security, biodiversity, microclimate regulation and erosion control.
Marmara	Walnut with annual crops, chestnut systems, vineyards with scattered trees and shelterbelts.	Income diversification, timber/nut products and sustainable land management.
Aegean	Olive-cereal, olive-legume, fig orchards with cover crops and vineyard-tree systems.	High-value permanent crops, erosion control and fig-based AGROFIG potential.
Central / Eastern / South-eastern Anatolia	Shelterbelts, dryland tree systems, pistachio-based systems and mountain silvopastoral systems.	Wind protection, drought resilience, livestock support and landscape restoration.

This regional diversity means that Türkiye's agroforestry strategy should be differentiated rather than standardised. Humid northern systems require support for multifunctional home gardens and forest-edge livelihoods, while semi-arid and dryland regions require drought-tolerant designs, shelterbelts and water-efficient tree-crop associations. For AGROFIG, the Aegean fig landscape is the most directly relevant entry point, but lessons from other regions can strengthen resilience, product differentiation and ecosystem-service monitoring.

5. Tunisia National Report: Summary

The Tunisia report presents agroforestry as a deeply rooted rural practice shaped by severe water scarcity, erosion risk, desertification gradients and historical land-use disruptions. Although agroforestry has only recently become a structured policy and scientific target, Tunisian farmers have long combined olive trees, fig trees, carob, date palms, cereals, forage crops and livestock. These systems are particularly visible in the mountainous North-West, where trees stabilise slopes and reduce erosion, and in southern oasis ecosystems, where multi-layered cropping creates favourable microclimates under arid conditions. The report frames Tunisia as a North African parallel to southern European multi-strata systems, but under stronger climatic stress.

The historical analysis identifies four periods. Before 1881, rural communities managed silvopastoral

ranges, intercropped rainfed fruit systems and three-tiered oasis systems using local knowledge and collective rules. During the colonial period, export-oriented monocultures, land seizure and forest centralisation disrupted traditional agro-silvo-pastoral user rights. After independence, reforestation and water-and-soil conservation programmes attempted to repair environmental damage, but agriculture and forestry remained institutionally separated. Since the 1990s, drought, degradation and international environmental commitments have pushed policy toward integrated watershed development. Agroforestry is now linked to the National Strategy for Sustainable Development of Forests and Rangelands to 2030.

Methodologically, the Tunisian report combines secondary statistics from forest and agricultural institutions, CRDA regional information, policy notes, project reviews and strong primary evidence. It includes 45 qualitative interviews with smallholders, community elders, forestry officers and cooperative representatives. It also uses evidence from the first Tunisian Living Lab workshop at the Faculty of Sciences of Tunis in January 2026, which gathered researchers, producers, processors and NGOs to map stakeholders, institutional chokepoints and promising crop associations. This makes the report especially rich in governance and field-level insights.

Bioclimatic zoning is central. Tunisia has a sharp north-south gradient from humid and sub-humid Mediterranean zones to hyper-arid desert. The North-West includes Béja, Jendouba, Siliana and Le Kef, where cork oak and Zeen oak silvopastoral systems are associated with steep slopes, erosion risk and limited rural diversification. The North-East includes Cap Bon and the lower Medjerda basin, where intensive agricultural blocks, boundary windbreaks and fruit-tree diversification respond to wind erosion, soil decline and salinisation. Central and southern zones rely more heavily on drought-adapted olive-fig systems, steppic silvopastoral arrangements and oasis systems based on date palm, fruit trees, vegetables and fodder layers.

The Tunisian fig value chain is a major focus. Figs are linked to mountain and rainfed production systems and can support product differentiation, local processing, territorial branding and rural income diversification. However, the report highlights structural barriers: fragmented producer organisation, middlemen dominance, limited processing capacity, weak certification, insufficient cold-chain infrastructure and limited access to finance. Agroforestry products often generate environmental benefits but are not adequately rewarded by markets. The report therefore argues for better labels, cooperative structures, processing units, territorial branding and stronger links between Living Labs and value-chain actors.

Governance is described through institutional silos, especially the “administrative chasm” between forestry institutions and agricultural production bodies. This weakens support for trees outside forests and for farmers managing mixed systems. The SWOT analysis indicates strengths in traditional knowledge, biodiversity and policy momentum, but weaknesses in coordination, finance, data and technical extension. Ecosystem-service benefits include water-use efficiency, microclimate optimisation, soil organic carbon, biodiversity enrichment, nutrient cycling and climate adaptation. The recommended roadmap includes legal clarification, integrated DGF-DGPA planning, long-term field monitoring, farmer training, payments for ecosystem services, Living Lab expansion and targeted support for fig-based agroforestry. Tunisia's priority is to transform dispersed traditional resilience into a coordinated national agroforestry development strategy.

Tunisia: Governance and Value-Chain Priorities

Table 3. Tunisian Governance and Value-Chain Priority Areas

Priority area	Problem identified in the report	Practical implication for AGROFIG
Institutional coordination	Forestry and agricultural institutions operate through separate mandates.	Create joint planning mechanisms for trees outside forests and mixed farm systems.
Water and soil management	Scarcity, erosion and salinisation shape all technical choices.	Prioritise drought-tolerant fig-olive systems, ground cover and water-harvesting design.
Market organisation	Middlemen dominance and weak producer organisation reduce farmer margins.	Support cooperatives, local processing, cold chain and territorial branding.
Evidence base	Long-term field data on carbon, water and biodiversity remain limited.	Use Living Labs as monitoring platforms and link farmer knowledge with research protocols.

Tunisia therefore differs from the three European and Anatolian cases because agroforestry is especially urgent as an adaptation response to water stress and desertification. The country's opportunity is not only to increase production but to stabilise rural territories, protect soils, maintain genetic resources and create value from local fig and olive systems. A coherent strategy should combine legal recognition, technical extension, value-chain upgrading and ecosystem-service valuation.

6. Comparative Tables

Table 4. Cross-Country Comparison of Agroforestry Identity and Risk

Comparison point	Italy	Spain	Türkiye	Tunisia
Historical basis	Coltura promiscua, olive polycultures, Sardinian oak grazing.	Dehesa, pastoralism, Mediterranean permanent crops.	Anatolian home gardens, orchards, forest-edge grazing.	Oasis systems, olive-fig systems, silvopastoral mountain landscapes.
Most emblematic system	Olive-based polyculture and Sardinian silvopastoral systems.	Dehesa with holm/cork oak and extensive livestock.	Aegean olive-fig-vineyard landscapes and Black Sea home gardens.	Oasis multi-layer systems and mountain olive-fig agroforestry.
Climate pressure	Drought, soil erosion, biodiversity loss, land abandonment.	Drought, desertification, tree ageing, regeneration failure.	Drought, erosion, wildfires, desertification and rural decline.	Water scarcity, salinisation, desertification and erosion.
Fig-based opportunity	Dottato and regional fig systems with legumes, cereals or forage.	Fresh and dried figs integrated with cover crops, grazing and annual crops.	Aegean dried fig landscapes with cover-crop and mixed-system potential.	Mountain fig systems linked to processing, branding and resilience.
Main governance issue	Regional fragmentation in CAP implementation.	Long-term management of dehesa and farm profitability.	Sectoral separation between agriculture and forestry.	Administrative split between forestry and agricultural bodies.

Table 5. Main Barriers and Recommendations by Country

Country	Main barriers	Main recommendations
Italy	Fragmented policy implementation, weak advisory services, limited farm-scale economic data, uneven market recognition.	Clarify CAP support, strengthen advisory systems, expand Living Labs, improve monitoring and develop fig-based value chains.
Spain	Tree ageing, poor regeneration, drought, profitability pressure, labour and technical constraints.	Support regeneration, tailor fig designs to water availability, improve training, link quality labels to agroforestry value.
Türkiye	Institutional separation, limited formal recognition, uneven farmer awareness and insufficient integrated pilots.	Create legal recognition, promote regional pilots, build technical capacity, valorise quality-labelled products and ecosystem services.
Tunisia	Administrative silos, water scarcity, middlemen dominance, weak processing/certification, limited finance and data.	Coordinate DGF-DGPA, support cooperatives, invest in processing and cold chain, create labels and monitor ecosystem services.

7. Overall Comparative Conclusion

The four reports converge on the same central message: Mediterranean agroforestry is not a marginal or experimental practice; it is a historically validated land-use model that can be modernised for climate adaptation, biodiversity conservation, soil protection and rural economic development. Italy and Spain have stronger formal policy frameworks and more visible European research networks, while Türkiye and Tunisia offer exceptional ecological diversity and traditional knowledge that remain insufficiently institutionalised. Spain stands out for the scale and identity of its dehesa systems, Italy for its combination of historical polyculture and CAP-linked innovation, Türkiye for its regional diversity and fig-production potential, and Tunisia for its relevance under severe water scarcity and desertification pressure.

For AGROFIG, the cross-country lesson is that fig-based agroforestry should not be promoted as a single universal model. It must be adapted to local water availability, soil depth, mechanisation, labour capacity, market orientation and institutional support. Across the four countries, the most promising pathway combines Living Labs, farmer training, territorial branding, short value chains, ecosystem-service valuation and clearer policy recognition of trees integrated with crops and livestock. The shared challenge is to move from fragmented traditional practices to coordinated, economically viable and scientifically monitored agroforestry systems.