

Silvopastoral System in Morocco

Subjects: Area Studies

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The silvopastoral systems in Morocco, which combine trees, herbaceous resources, and livestock on the same unit of land, are a socio-economically and ecologically productive alternative to traditional management systems. Successful silvopastoral systems require effective limitation of agricultural expansion and deforestation phenomena, which could preserve the beauty and diversity of the landscape.

Keywords: silvopastoral ; Mediterranean region ; sustainability ; northern Morocco ; grazing ; forest

1. Introduction

A silvopastoral system is a productive arrangement characterized by a combination of pastures and trees in the same area in order to increase the profitability of the system through the diversification of products while preserving the natural environment. It is considered a sustainable method of restoring degraded pastures ^[1]. The silvopastoral system is identified by at least three components, usually pasture, trees, and livestock. Farmers and different users are solely responsible for the sustainable functioning of the silvopastoral system ^{[2][3]}. Between these different components, both ecological and economic interactions are created. An ecological interaction becomes beneficial when the silvopastoral system shows evidence of an increase in yield per unit area and sustainable use of resources with an improvement in environmental aspects.

The exploitation of silvopastoral resources, through the use of forest vegetation, not only provides tangible products such as wood, forage, medicinal plants, food, and feed, but also intangible products such as biodiversity improvement ^[4]. The major limitations of silvopastoral areas are the potential competition between trees and pastures for light, water, and nutrients, as well as the growing needs of the population for agricultural land and natural resources.

In the Mediterranean basin, topography, climate, and vegetation types are favorable for silvopastoral activities. The Mediterranean silvopastoral system, more than elsewhere, could be considered a better example of extensive farming systems, which are characterized by a strong integration of livestock, agriculture, and forestry into the family farm ^[5]. The animals are managed in a traditional way on these lands where they browse woody and herbaceous vegetation. The Spanish “dehesa”, which means pasture in castellan or “montado” in Portuguese, is a communal domain composed of a pasture in the undergrowth located at the level of the Iberian Peninsula ^[6]. This forest pasture represents one of the most successful examples of silvopastoral systems in the Mediterranean region. The aim of this literature review is to analyze the importance and evolution of Moroccan silvopastoral systems with a focus on the southern Mediterranean region of northern Morocco, as well as how to support their sustainability.

In this review, we analyze, at the national scale, the importance of silvopastoral systems, their historical evolution, socio-economic conditions, and climate change impacts. Then, we focus on the southern Mediterranean region of northern Morocco where we explore the useful strategic functions of silvopastoral areas and drivers of the observed changes. In the end, we present certain crucial development programs that could be more encouraged to support sustainable management actions of silvopastoral resources.

2. Discussion Focused on Their Importance, Strategic Functions, and Recent Changes in the Mediterranean Side

Forest ecosystems are dominated by trees and made up of biologically integrated communities of plants, animals, and microbes, as well as the soils and atmospheres with which they interact ^[8].

Forest has a strong impact on the quality of our environment and could be considered a full actor in the management of the environment and natural resources.

Through carbon dioxide sequestration in wood and soil, forests play a direct role in the cycle of the main greenhouse gases. By photosynthesis, plants fix this gas in terrestrial biomass, mainly the forest. This recycling of carbon in the forest is extremely important, since each year, 120 Gt of carbon is exchanged between the earth's atmosphere and vegetation, compared to the 6 Gt of carbon emitted by the combustion of fossil sources. This exchange is never completely balanced, and forests therefore play a positive role in regulating the greenhouse effect ^[9]. In Morocco in 2010, the carbon stock of living forest biomass was estimated at 256 million tonnes, equivalent to 89 t/ha ^[10].

To fully understand the socio-economic importance of the Rif forest and according to the available data, we took the forest area of the western Rif as an example, one of the most important areas in the study region. This forest area offers more than 200,000 working days, guaranteeing employment throughout the year for an average workforce of 800 workers. The production is composed of timber (310 m³/year), industrial and service timber (9340 m³/year), fuelwood and firewood (19,800 m³/year), cork (8150 steers/year), and heather strains (860 q/year). These productions provide revenue for rural communities that amounts on average to almost 568,000 euros annually. In addition to forest products, the forest offers significant landscaping and floristic diversity for developing and promoting tourism and hunting ^[11].

3. Conclusions

The silvopastoral systems in Morocco, which combine trees, herbaceous resources, and livestock on the same unit of land, are a socio-economically and ecologically productive alternative to traditional management systems. Successful silvopastoral systems require effective limitation of agricultural expansion and deforestation phenomena, which could preserve the beauty and diversity of the landscape.

Nowadays, most of these systems are facing great difficulties as the world's forests deteriorate. This situation is explained by an alarming degradation due to the combination of both climatic and anthropic drivers. The present condition of Moroccan silvopastoral areas, especially in the southern Mediterranean region of northern Morocco, is complex. In order to ensure the sustainability of these resources, decision-makers must further develop appropriate policies and strategies that boost management and restoration actions for different users engaged in sustainable silvopastoral systems.

Future studies should assess the actual damage and degradation of the Moroccan silvopastoral system, as an integral part of the Mediterranean region, due to anthropogenic use under the impact of climate change. Likewise, Mediterranean countries need to combine their efforts in order to reduce this damage and assess the realistic socio-economic and ecological benefits of silvopastoral systems to promote their sustainable development and to ensure sound investments.

References

1. Gomes, F.J.; Pedreira, B.C.; Santos, P.M.; Bosi, C.; Lulu, J.; Pedreira, C.G.S. Microclimate effects on canopy characteristics of shaded palisadegrass pastures in a silvopastoral system in the Amazon biome of central Brazil. *Eur. J. Agron.* 2020, 115, 126029.
2. Papanastasis, V.P. Silvopastoral systems and range management in the Mediterranean region. In *Western European Silvopastoral Systems*; Etienne, M., Ed.; FAO: Rome, Italy, 1996; pp. 143–156.
3. San Miguel, A. Gestión silvopastoral y conservación de especies y espacios protegidos. In *Pastos, Desarrollo y Conservación*; Robles, A.B., Ramos, M.E., Morales, M.C., Simón, E., González-Rebollar, J.L., Boza, J., Eds.; Junta de Andalucía: Granada, Spain, 2003; pp. 409–422.
4. Robles, A.B. The Mediterranean pastures and silvopastoral systems: Basic concepts. In *Agroforestry Systems as a Technique for Sustainable Land Management*; Mosquera-Losada, M.R., Fernández-Lorenzo, J.L., Rigueiro-Rodríguez, A., Eds.; Unicopia Ediciones; AECID: Madrid, Spain, 2009; pp. 59–69.
5. Casals, P.; Baiges, T.; Bota, G.; Chocarro, C.; de Bello, F.; Fanlo, R.; Sebastia, M.T.; Taull, M. Silvopastoral systems in the Northeastern Iberian Peninsula: A multifunctional perspective. In *Agroforestry in Europe: Current Status and Future Prospects*; Rigueiro-Rodríguez, A., McAdam, J., Mosquera-Losada, M., Eds.; Springer Science and Business Media B.V.: Dordrecht, The Netherlands, 2009; pp. 161–182.
6. Linares, A.M. Forest planning and traditional knowledge in collective woodlands of Spain: The dehesa system. *For. Ecol. Manag.* 2007, 249, 71–79.
7. Moher, D.; Liberati, A.; Tetzlaff, J.; Altman, D.G. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med.* 2009, 6, e1000097.
8. Kimmins, J.P. Ecosystem management and landscape ecology: The ultimate focus in forest ecology. In *Forest Ecology. A Foundation for Sustainable Forest Management and Environmental Ethics in Forestry*, 3rd ed.; Chapter 19; Prentice

Hall: Upper Saddle River, NJ, USA, 2003.

9. Dupouey, J.L.; Pignard, G.; Hamza, N. La séquestration de carbone en forêt. *Forêt-Entrep.* 2006, 168, 15–18.
10. FAO (Organisation des Nations Unies pour l'alimentation et l'agriculture). *Situation des Forêts du Monde*; FAO: Italy, Rome, 2011; 176p.
11. SPEF (Service Provincial des Eaux et Forêts). Potentialité et problématique forestière dans la province de Chefchaouen. In *Rapport du Haut-Commissariat aux Eaux et Forêts et à la Lutte Contre la Désertification*; SPEF: Chefchaouen, Morocco, 2006.

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