



# World Congress Silvo-Pastoral Systems 2016

Silvo-Pastoral Systems in a changing world: functions, management and people



UNIVERSIDADE  
DE ÉVORA



UNIVERSIDAD DE EXTREMADURA



Instituto de Ciências Agrárias e Ambientais Mediterrâneas



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## Main conclusions from each Working Group

### WG 1 - Large scale trends: assessing and mapping at the regional and global scales

Management of forest ecosystems should not exclusively occur at a single scale. It was demonstrated that managing forest landscapes is a complex practice of understanding the critical patterns of the landscape and their reciprocal interrelationship through processes. Information infrastructure such as comparable longitudinal land cover maps and attention to definitions and thresholds are critical to making progress.

### WG 2 - Landscape assessment and classification: consistency in fuzzy patterns

Silvo-pastoral systems can be regarded as an important actor in maintaining traditional, low-fuel supported agro-forestry cultural landscapes.

Montados, dehesas and other wood pastures are under pressure everywhere and there is a need to promote other functions than pure Silvo-pastoral, such as recreational and nature functions to maintain these landscapes and their economic, environmental and cultural diversity. We can learn from the past in countries as e.g. Switzerland but also from other silvo-pastoral systems around the world. We are just at the brink of discovering new knowledge and sharing knowledge.

### WG 3 - Grazing systems, livestock management and animal products

#### 3.1. Animal productivity from silvo-pastoral systems

Production of milk or meat in silvo-pastoral systems (SPS) is normally supported by supplements and some presentations compared production using byproducts, acorns or concentrates. In silvo-pastoral grazing systems, some farms were more profitable because they use dual purpose animal breeds. Some others take advantage from improved product quality (goat milk fat) that significantly higher in SPS when compared with monoculture or native grass grazing systems.

#### 3.2. Feeding behaviour: Assessing impact of the silvopastoral system on production

Impact of the silvo-pastoral system on animal production could be assessed using animal variables (like grazing pressure or animal performance). The improvements in animal physiology and behaviour, including preferences, can compensate for decrease in sward yield.

For assessing the impact of the silvo-pastoral system on the ecosystem, indicators such as lichens or greenhouse gas emissions are broad possible approaches.

#### 3.7. Tree-grass interaction: botanical composition; plant chemical profile

Research on the effect of shade on the persistence, biomass production and nutritional composition of different pasture species was presented for contrasting silvo-pastoral system.

While shade did not significantly impact pasture quality and species persistence in the highly diverse dehesa system, it had various effects on similar parameters in the less diverse silvo-pastures in the temperate to subtropical systems in the southern United States. The studies were limited to pasture performances without considering grazing impact.

#### **WG 4 - Forest management and modeling: silviculture, tree management and planning**

The importance to include leaf metrics in the decisions about silvo-pastoral systems in water limited systems;

The relevance of overstory density and composition in the quality of understory/pastures;

The relevance of new woodland for the voluntary carbon market;

The importance to have more information about the composition, structure and design for new silvo-pastoral system to optimize production;

The necessity to include the quality and quantity of non wood forest products in the analyses to determine the most sustainable habitat for these species.

#### **WG 5 – Pests and diseases**

Pests and diseases are frequently associated with multiple risks, contributing to sanitary problems of silvo-pastoral systems. They may further compromise tree regeneration in these systems characterized by low tree density. Research on management tools is required to develop sustainable strategies to cope with pests and diseases.

#### **WG 6 - Wild fires and natural hazards**

The common thread was found to be the interaction between fire and grazing that characterizes the specific aspects of the biomass consumption and its associated ecological and social effects. This suggested the importance of further reflection on the modalities and on the prerogative regarding the use of fire and of grazing for the management of the silvo-pastoral systems.

Presentations highlighted the parallel between biomass consumption by either herbivores or fire (including as ecological proxies for decomposition) and their intimate associations with fundamental properties of the fire regime such as fire frequency and fire severity.

#### **WG 7 - Water and carbon relations and climate change**

A better understanding of the ecophysiological processes related to tree and understory functioning, above and belowground, and of their interactions is needed for modeling purposes and to adapt management to climate and land use change.

#### **WG 8 - Wood and non wood products, transformation and industry**

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#### **WG 9 - Biodiversity conservation and ecological functioning**

Conservation problems in silvo-pastoral systems are context-dependent but the effect of management options as a driving force affecting biodiversity and ecosystem services is of global concern. The design of practical conservation measures and the payment for

environmental services as a policy tool for conserving these man-shaped ecosystems are a priority.

The framework of functional ecology can improve our understanding about the ecological consequences of land-use and climate change in silvo-pastoral systems.

Land-use and climate change may affect functional diversity, providing insights about the capacity of silvo-pastoral systems to adapt to environmental changes (resilience).

It is important to understand how functional features of species vary at various scales, especially when related to habitat size requirements, and to spatial processes.

Species track the abandonment of silvo-pastoral practices through their functional traits, and that these responses cascade into ecological impacts on soil properties and other ecological functioning.

Approaches using functional ecology and functional diversity have the potential to improve our understanding, in an aggregated manner, about the ecological consequences of changes in silvo-pastoral practices and other environmental changes in silv-pastoral systems.

The importance of facilitation vs competition in plant communities, depends on environmental harshness, but it is also mediated by plant traits of this species interacting.

More research is needed to found indicators of ecosystem functioning and the role of microorganisms on this functioning.

In agro-silvo-pastoral systems the different components (trees, shrubs and grasslands) have processes at different temporal and spatial scales. This spatial variability confers the system high resilience in relation to global change.

### **WG 10 - Ecosystem services as an enabling framework towards the transition to sustainable silvo-pastoral systems**

Evidence showed that agroforestry enhance biodiversity and ecosystem service provision relative to conventional agriculture and forestry. SPS could be a strategically beneficial land use in rural planning if its inherent complexity is considered in policy measures. SPS constitute typical coupled social-ecological systems with key Social-ecological values. They enhance conservation status with sustainable practices. In all, SPS offer a higher provision of ES and therefore are susceptible of a higher payment for ES. In all, SPS could be rentable systems with important societal and ecological benefits.

### **WG 11 - Economics of silvo-pastoral systems, including new markets**

The conservation of silvo-pastoral systems in the world relies on the payment of environmental services, which are linked with traditional uses.

### **WG 12 - Innovation in remote sensing and image analysis**

Remote sensing has already proven to be a cost effective approach for monitoring and assessing silvo-pastoral systems, however the system`s complexity encloses many methodological and technological challenges.

### **WG 13 - Integrated social sciences approaches to silvo-pastoralism**

We had many diverse approaches to integrating social and ecological science—it is hard to balance the two, because from each person's disciplinary background, we tend to think of the other side in simplistic terms, as a black box, or a background, or an accepted given, while we focus on the complexities of our most familiar discipline.

**WG 14 - Progressing towards integrative approaches and management support**

There are integrative analytical approaches being developed on specific dimensions of the silvo-pastoral system (as evaluation of management practices on biodiversity levels, or the effects of the tree stand on the productivity of other components of the system) – to achieve results, they require strong willingness from those involved for joint work across disciplinary boundaries, context specific application, and long term time span.