Advances in Silvopastoral Systems in Latin America

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World Congress Silvo-Pastoral Systems 2016
Silvo-Pastoral Systems in a changing world: functions, management and people

CONTEXT

Due to the **increase in animal protein demand** and consumption, livestock will continue as one of the fastest growing sub-sectors in agriculture.

The UN Population Division predicts that population in Latin America and the Caribbean could **rise to 784 million by 2050**. Therefore, the forests in the region will very likely continue to be cleared for agriculture and ranching.

In Latin America, more than **90 million ha of land is under pasture**, mostly as a result of forest conversion to cattle ranching.

Meat and milk consumption assume greater **political and economic importance** than in any other region of the world.

Silvopastoral Systems

In this context, sustainable silvopastoral systems are suggested as a key solution to the conflict between expanding agricultural production and conserving natural ecosystems.

Silvopastoral advantages can be described as the provision of:
multiple products (e.g., food, wood, fodder, medicinal plants)
or
services (e.g., maintenance of soil fertility, control of erosion, microclimate improvement, biodiversity enhancement, watershed protection, carbon sequestration) by the trees

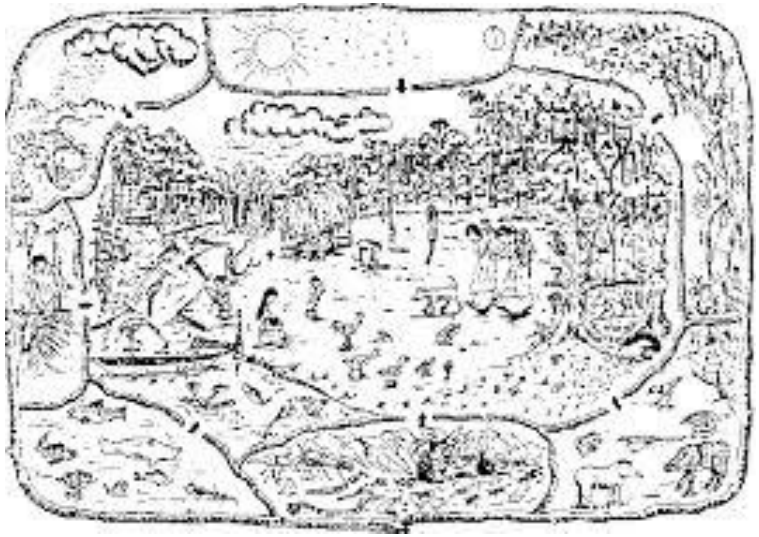
Silvopastoral systems assist to reach Sustainable Development Goals (SDGs)

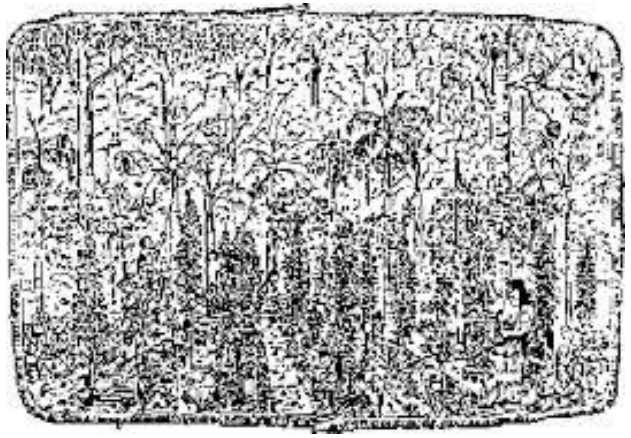
GLOBAL AGENDA FOR
SUSTAINABLE LIVESTOCK

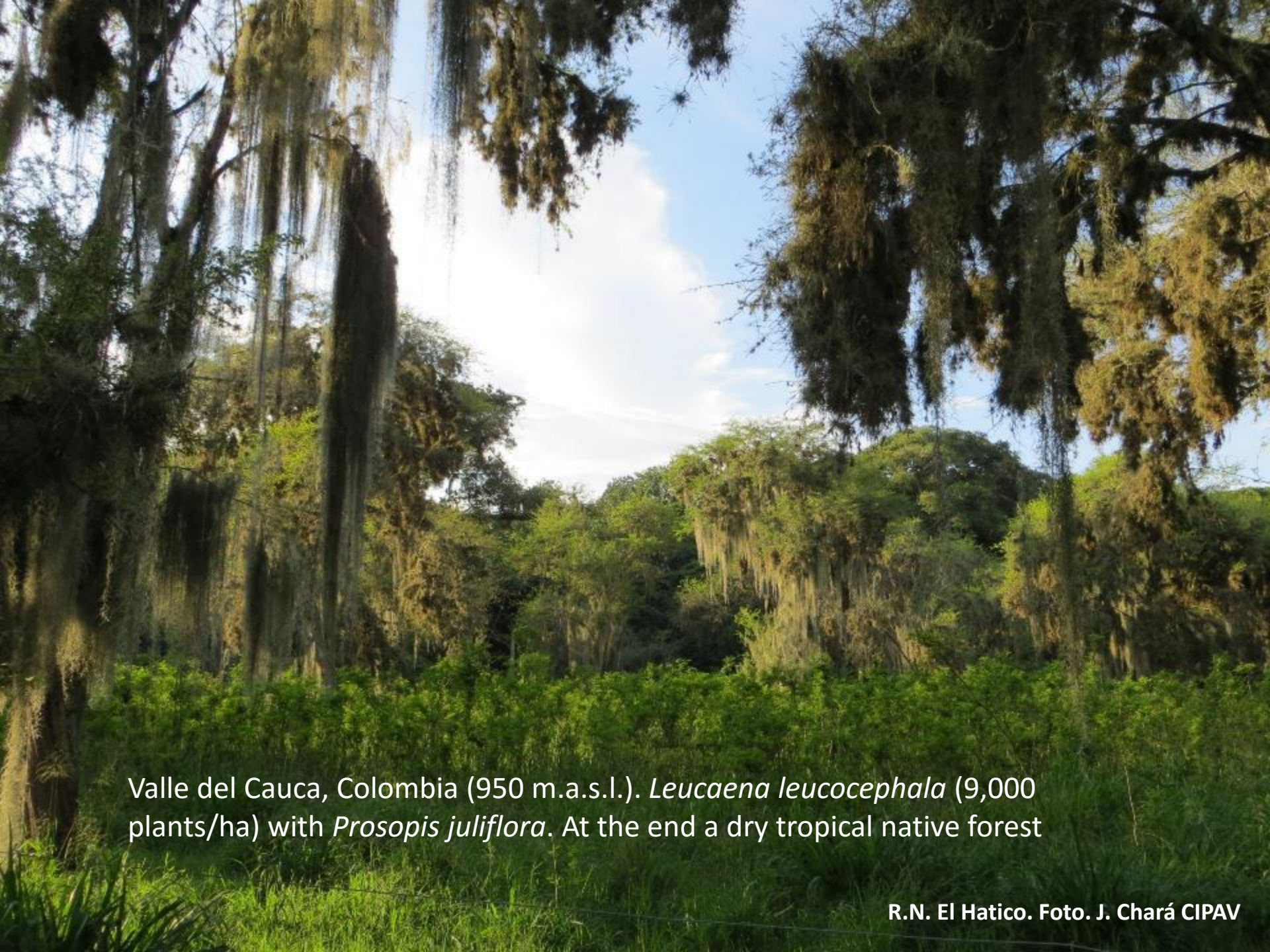
Silvopastoral Systems

Cattle have grazed in forests since the domestication of *Bos Taurus* and *Bos indicus* (Ramírez-Ávila, 2007), feeding on tree forages which, like mulberry Morus alba, have been known for millennia (Mosquera-Losada 2005)

"conucos" carried out for centuries by native people in Central America (Esquivel and Hammer 1988)







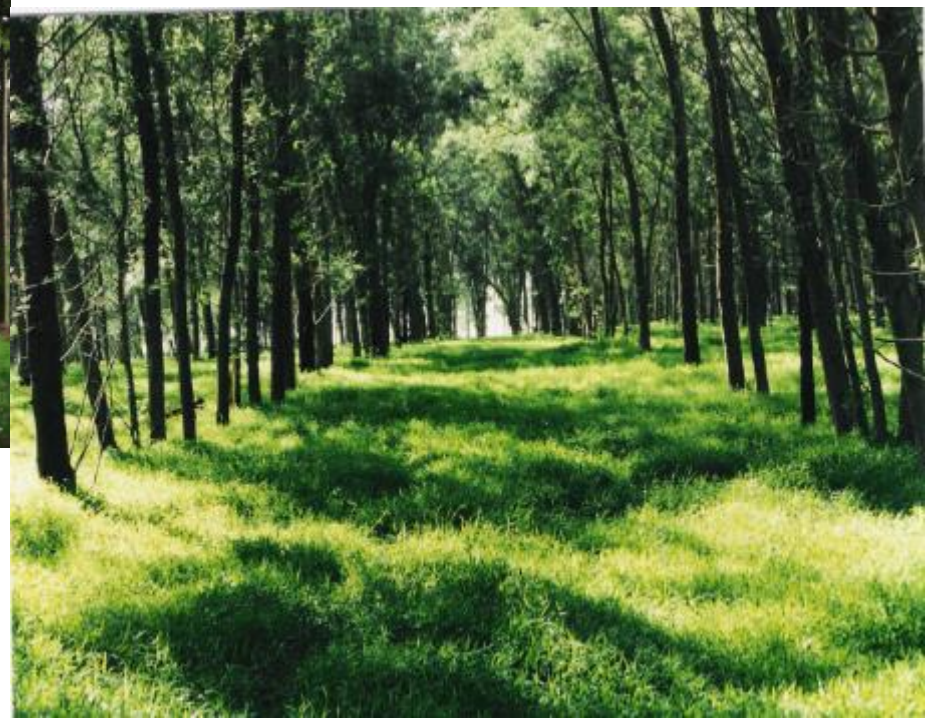
Valle del Cauca, Colombia (950 m.a.s.l.). *Leucaena leucocephala* (9,000 plants/ha) with *Prosopis juliflora*. At the end a dry tropical native forest

R.N. El Hatico. Foto. J. Chará CIPAV

Populus deltoides **"Stoneville 67" (6x6 m), pasture of *Bromus catharticus* and *Lolium multiflorum,* Riparian Delta, ARGENTINA**

Cold zone of Brazil

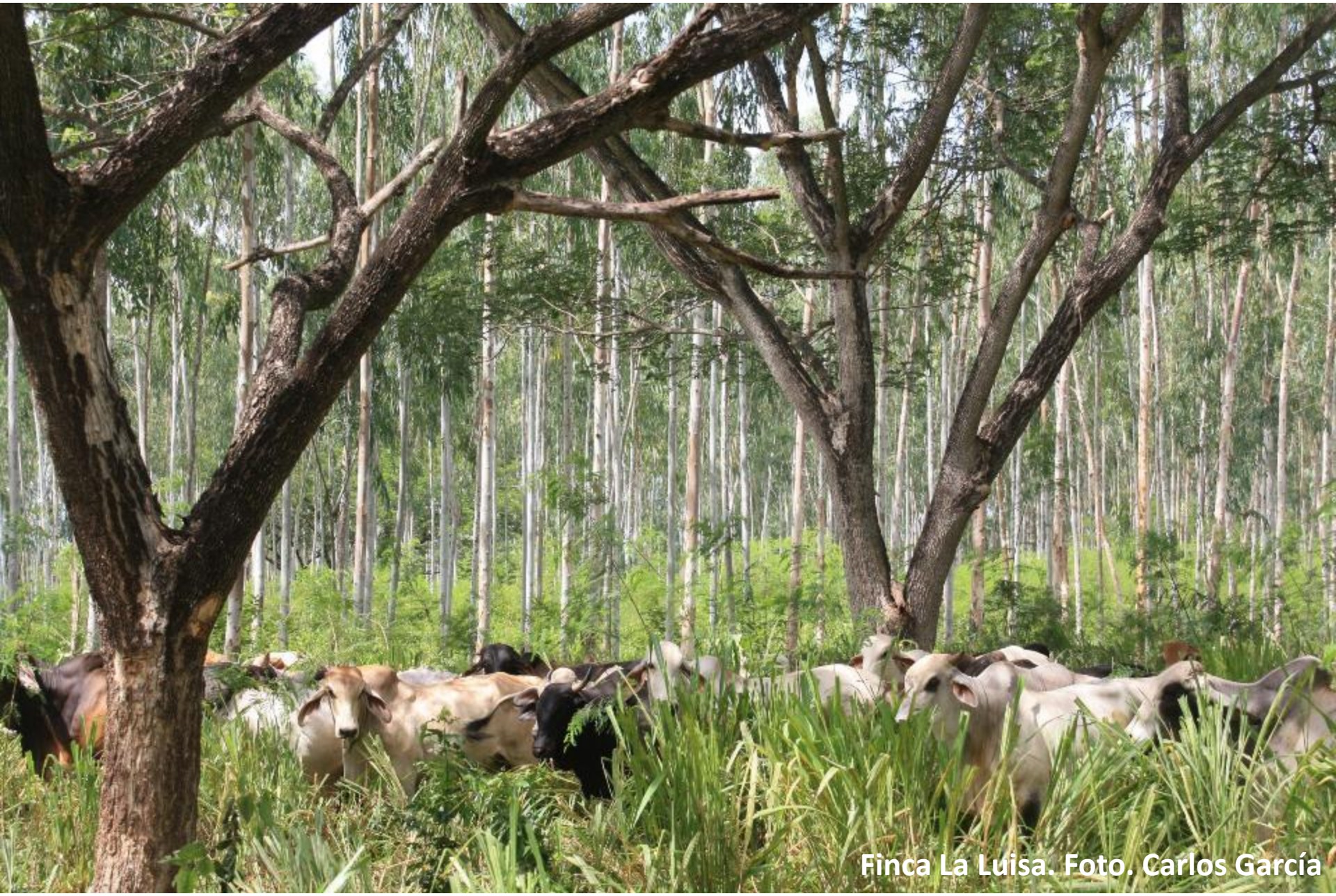
Eucalyptus grandis + tropical grass (*Brachairia brizantha*), and beef cattle at a smallholder property in Paraná State, Brazil



Black wattle and *Digitaria diversinervis* grass, Rio Grande do Sul

Valle del río Cesar, Dry Caribean, north Colombia. Leucaena in strips (30 m wide) with eucalipto and some native tres (Albizia saman), after 5 yr

Finca La Luisa.
Foto. Julián Chará



Finca La Luisa. Foto. Carlos García

Arid and semiarid zones of Chile

Tamarugo (*Prosopis tamarugo*) plantation, Tarapacá Region, Chile

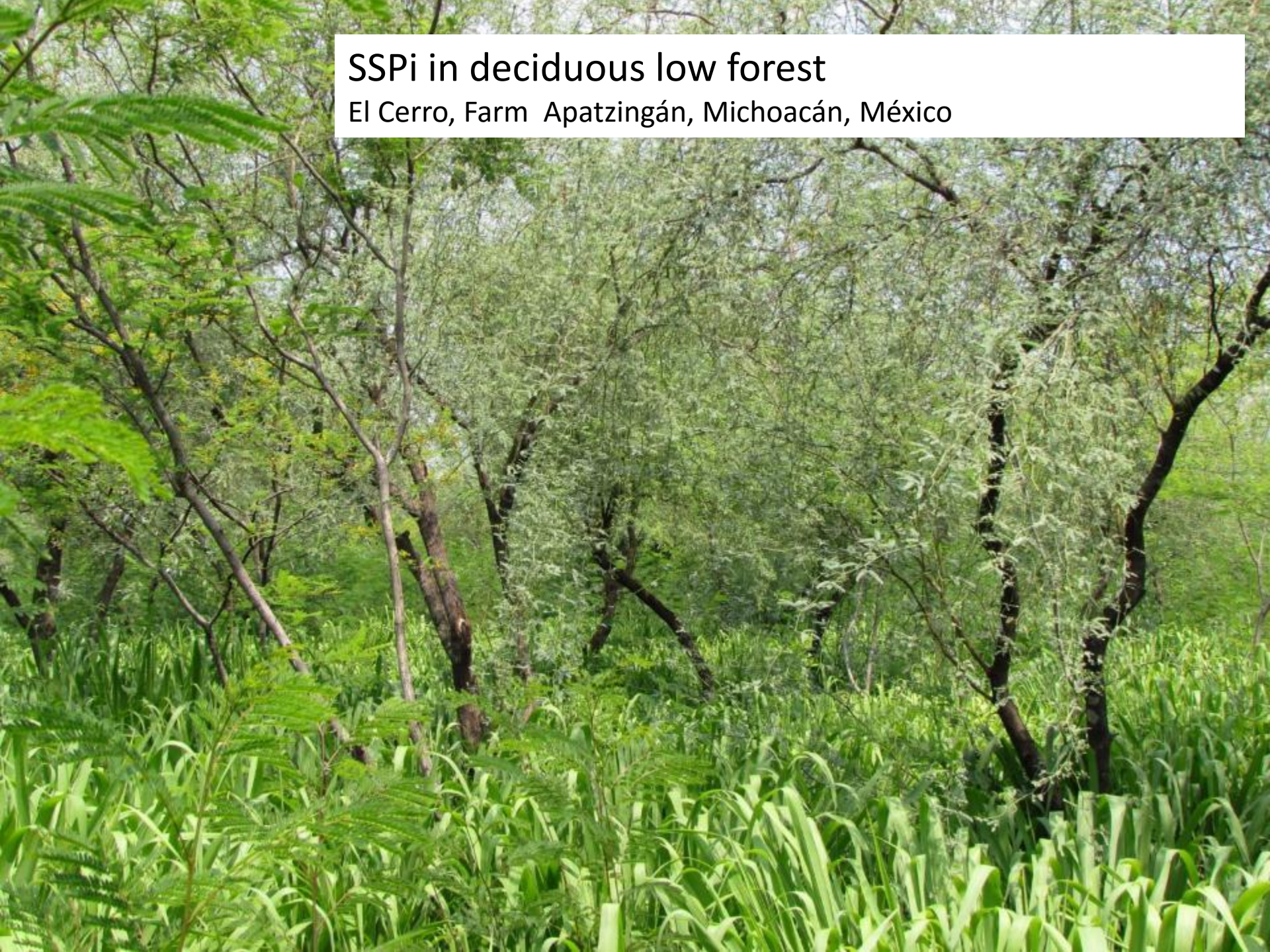
Algarrobo tree (*Prosopis chilensis*) for shelter from the sun, Province of Chacabuco, Chile

Acacia saligna in plantations in the Region of Coquimbo

Crotalaria-Teca en Venezuela. Foto. Eduardo Escalante

Silvopastoral systems in temperate zones of Chile

Radiata pine-based silvopastoral system established in two lines of planting with densities of 500 and 1000 trees/ha


SSPi in deciduous low forest
El Cerro, Farm Apatzingán, Michoacán, México

Double rows >427 trees/ha

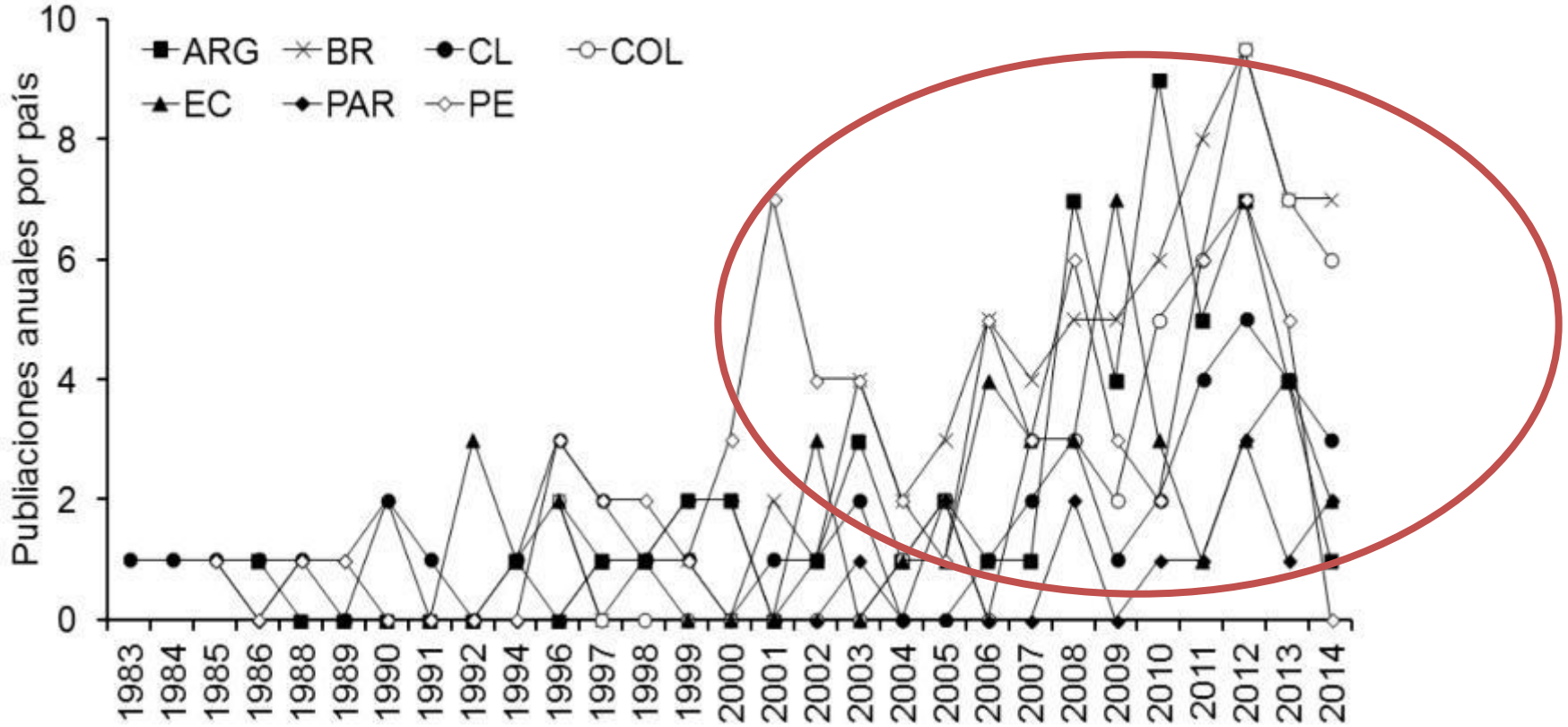
8 m

Corrientes *Brachiaria* with pine

SSP in native *Nothofagus* forest in Patagonia, Argentina

Silvopastoral system based on natural grassland and ponderosa pine with 350 trees ha^{-1} at 21 years old.

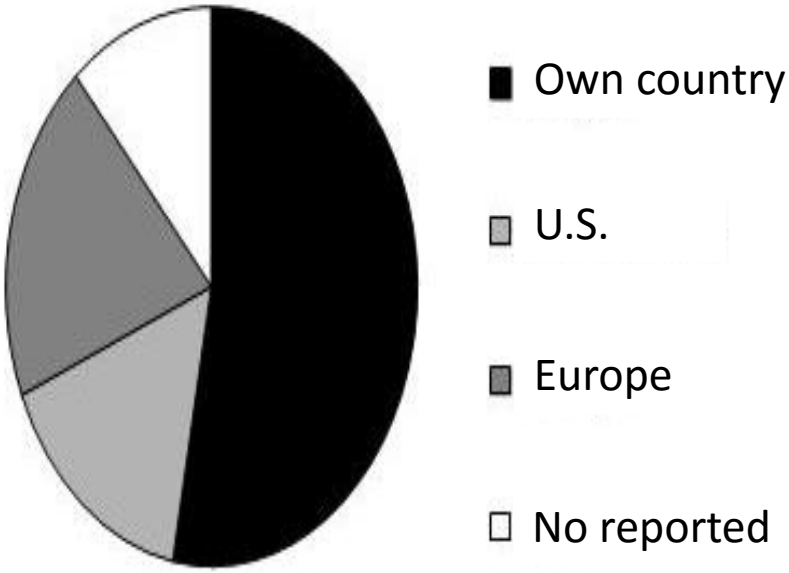
➢ The implementation of the SSP has increased in the last 18 years in different regions of Latin America.



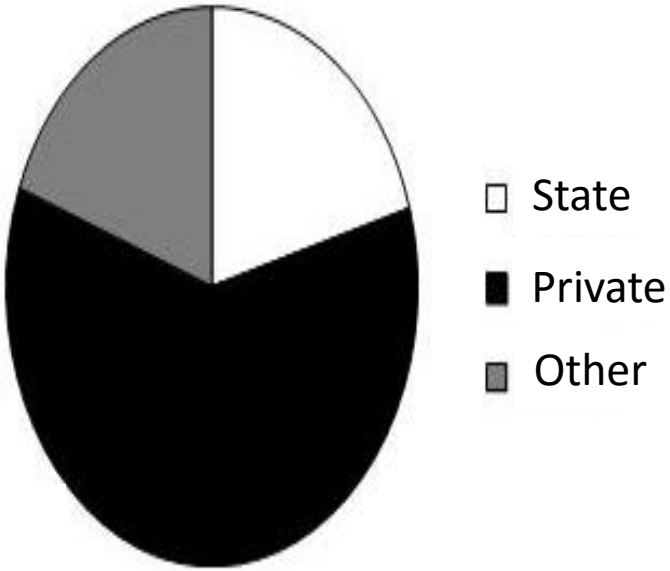
Soler et al., 2015

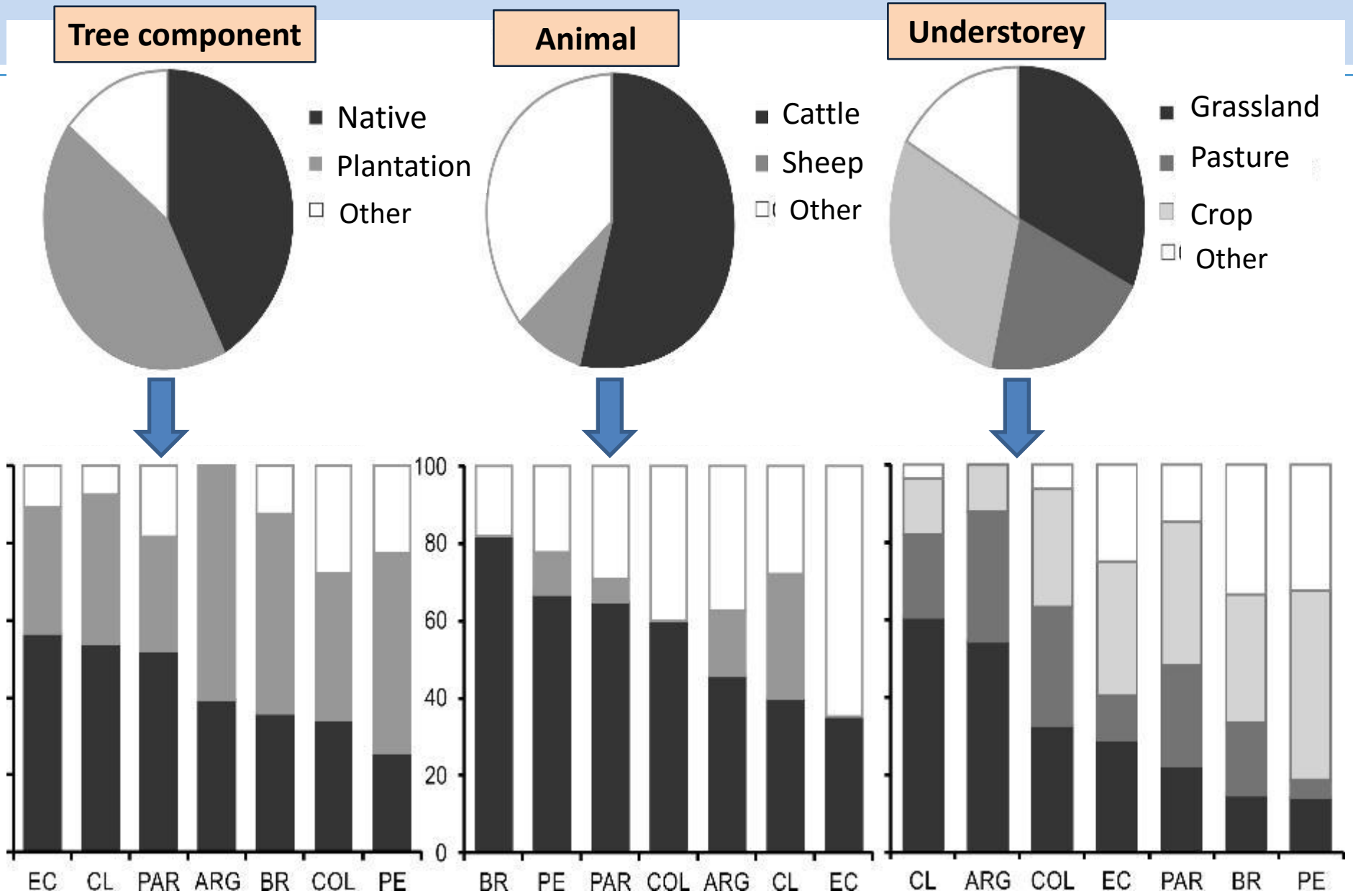
Research in different regions of Latin America

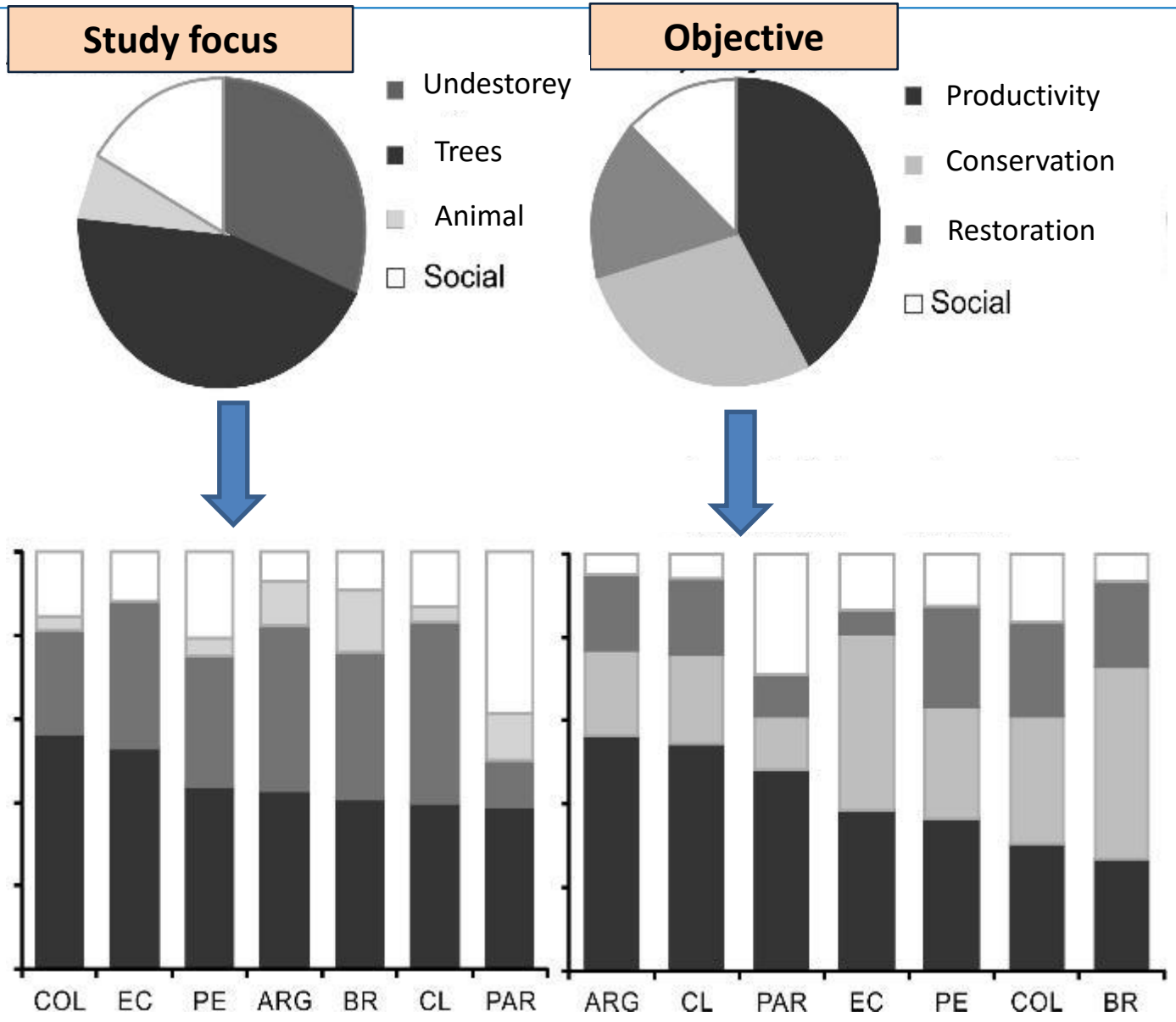
Funding



Land



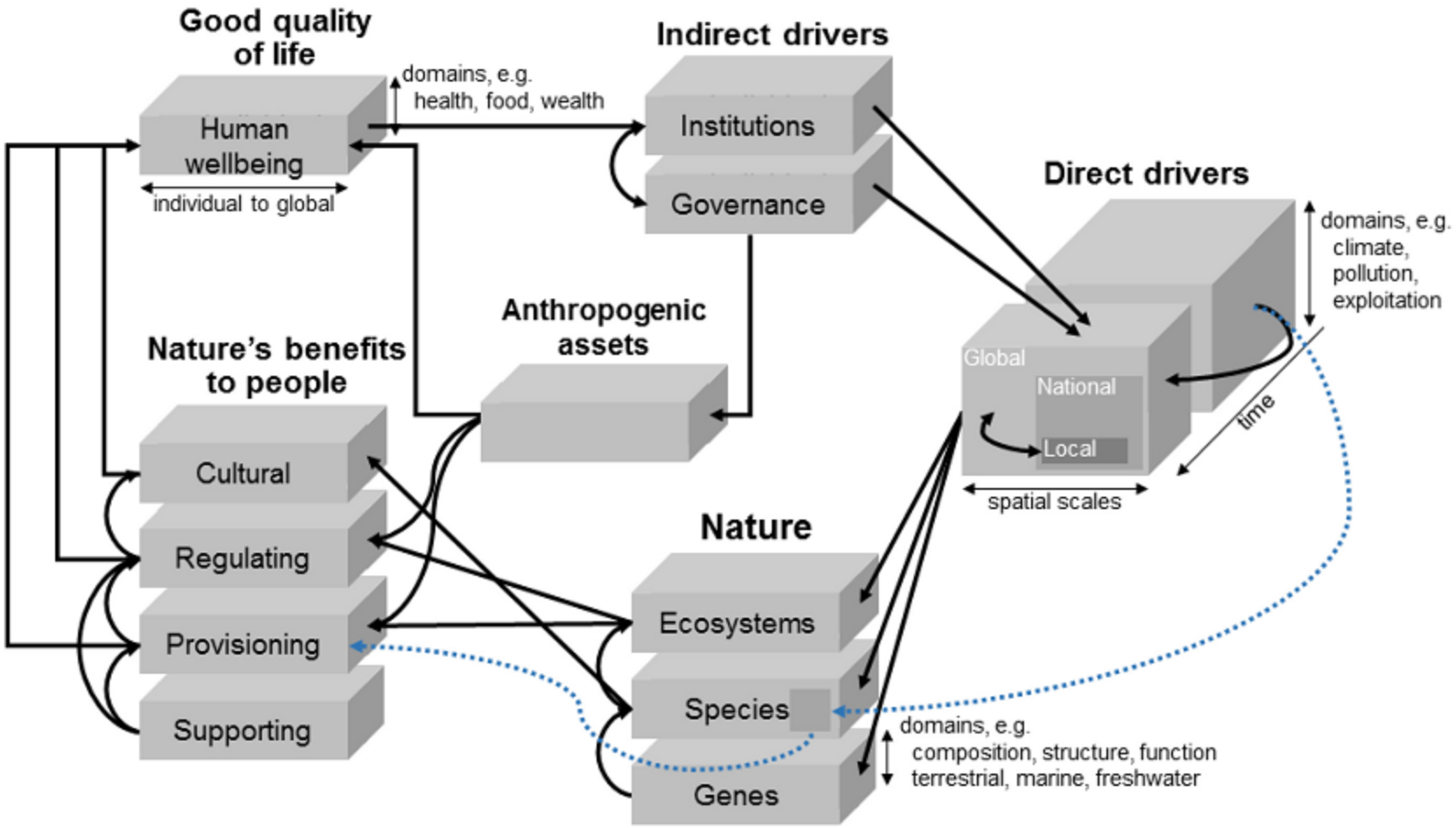

Tree component
Native
Plantation
Other
Animal
Cattle
Sheep
Other
Understorey
Grassland
Pasture
Crop
Other
100
80
60
40
20
0
EC CL PAR ARG BR COL PE
BR PE PAR COL ARG CL EC
CL ARG COL EC PAR BR PE


Study focus
Undestorey
Trees
Animal
Social
Objective
Productivity
Conservation
Restoration
Social
COL
EC
PE
ARG
BR
CL
PAR
ARG
CL
PAR
EC
PE
COL
BR

Can we increase the surface of the SSP?

Valuation of ecosystem services SSP

Silvopastoral advantages can be described as the **provision of multiple products** (e.g., food, wood, fodder, medicinal plants) **or services** (e.g., maintenance of soil fertility, control of erosion, biodiversity enhancement, watershed protection, carbon sequestration) by the trees.


Good quality of life
Human wellbeing
individual to global
domains, e.g. health, food, wealth
Indirect drivers
Institutions
Governance
Direct drivers
domains, e.g. climate, pollution, exploitation
Global
National
Local
time
spatial scales
Anthropogenic assets
Nature's benefits to people
Cultural
Regulating
Provisioning
Supporting
Nature
Ecosystems
Species
Genes
domains, e.g. composition, structure, function terrestrial, marine, freshwater

Added value and industry

Bioenergy

LEÑA EN BLANCO

Gracias !

Manejo de Bosque con
Ganadería Integrada