



## Optimization of tree arrangements in silvopastoral systems in the Pampa biome

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### Introduction

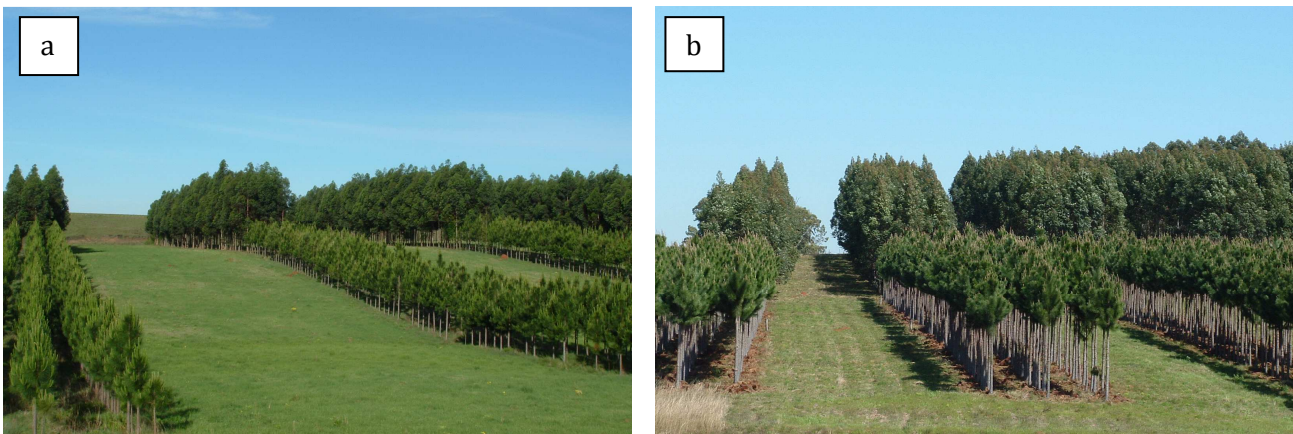
One of the most important decisions before establishing a Silvopastoral System (SSP) is the choice of the spacing and the arrangement of the trees in the field. This decision will affect for years the environmental conditions for the fodder plants growth, since the moment in which the trees are planted up to their harvesting at the end of the rotation. The fodder plants normally show an abrupt reduction of productivity when subjected to radiation levels below 50% (photosynthetically active radiation – PAR). However, the spacing between rows cannot be so great in such a way to compromise the amount and the quality of the forest products intended to be obtained.

### Material and Methods

This model of production advocates the use of triple rows of trees in the SSPs, which represents an advance over the older arrangement formed by single rows, extensively used in many localities situated in the Pampa biome (Southeastern region of the Rio Grande do Sul State, Brazil). This new proposed type of arrangement allows an appropriate level of radiation incidence between the tree lines, without reducing drastically the number of trees per unit of area, while maintaining an effective protection of the soil, animals and pasture.

### Results and Conclusions

Fig. 1 - Silvopastoral systems composed by native pastures and forest species *Pinus elliottii* and *Eucalyptus grandis*, planted at a) 500 trees/ha and, b) 1,000 trees/ha density.



The assessments at the age of six years showed that the system with 500 trees/ha, established in triple rows (3 x 1.5) x 34 m, allowed a radiation availability of 65% under the canopy of eucalypts (*E. grandis*) and of 90% for pines (*P. elliottii*), when compared to full sunlight. In the system with 1,000 trees/ha, by using also a triple row layout, but a spacing of 14 m instead of 34 m, the correspondent values of radiation for eucalypts and pines under the canopies were 30% and 65%, respectively. In order to avoid an eventual excess of shading during the production cycle of the eucalypts, the farmers can manage the planted trees by means of thinning or even by pruning. The trees that are removed during the thinning procedure can be negotiated in the market, contributing in this situation for the anticipation of the income to the producers, since the projects are normally of a long term duration.