

The assessment of land suitability in the implementation of homogeneous stands of Eucalyptus: prospects for a forest sustainability in Brazil

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Abstract

The demand for forest products is growing, and in this context commercial plantations of eucalyptus have been planted due to multiple uses of the wood. Areas intended for the establish most of new populations of the genus, when judged against the test systems commonly used in Brazil, are classified as inefficient. The systems are based primarily for the characteristics of agricultural crops, ignoring eucalyptus tolerance to some factors, such as low soil fertility, and the high level of technology employed in commercial plantations. This paper is a critical analysis of some systems of land suitability and their application to the implementation of homogeneous forests of eucalyptus.

The systems of land suitability evaluation, seek to define the quality of sites and make possible recommendations for the improvement of limiting factors for the development of plantations. The attributes with direct influence on the productivity of eucalyptus, can be divided into five factors: effective depth, drainage, soil fertility, erosion susceptibility and impediments to mechanization. Due to the current situation of forestry in Brazil, it is justifiable to use a system compatible with limitations that are less restrictive and inclusion of other factors relevant to the planting of eucalyptus.

Key words

Ability to use, forest planning, eucalyptus trees, diagnostic attributes.

Introduction

Tropical ecosystems have suffered great pressure due to the demand of the population for their forest products, construction and agricultural expansion. The establishment of forest stands, without planning their technical efficiency is the target of several criticisms, coupled with lack of reliable information, showing the need to research and organize the sector. This picture becomes more complicated when we cover the entire Brazilian territory, due to the size, heterogeneity of environmental factors and different stages of regional development.

Forestry implies the adoption of management practices and the division of strategic nature reserves and conservation areas, to ensure the survival of flora, fauna, protection of springs and other natural resources. The planning of land use should be a priority when trying to mitigate the actions of degradation and deforestation, since the use of natural resources is intense. Even with the development of forestry and consolidation of the Brazilian forest, land evaluation for forestry is still deficient, mainly due to a lack of precise information the physical environment and behavior of the species planted.

Brazil has been gaining attention from international investors because of the high forest productivity not only due to promising financial returns, but to present an inverse relationship with the typical volatility of capital markets (Abraf 2008). Another consideration for the return on forestry activities is that they can be preserved, renewed or extended in quantities needed for commercial exploitation, as a variable stock, similar to capital (Golfari 1980). Planted forests have made a great contribution to the area of the Brazilian forest, mainly of with genus Eucalyptus (SBS 2007). The successful expansion of homogeneous stands of this kind is due to the adaptability of the crop to various environmental conditions, diversity of uses and a large number of species. Probable the exotic species have natural resistance to insects and microorganisms and may have a higher production compared to the native plants of the region (Ferreira 1989). This paper aims to review the systems of assessment of the suitability of the land and its use in the implementation of homogeneous plantations of eucalyptus in Brazil.

Material and methods

Eucalyptus

Eucalyptus comes originally from the forests of the Australian and Indonesian archipelago. In general they are adapted to different vegetation types, soil conditions and climate are mostly typical forest trees reaching high 30 to 50 metres tall, and open forests with smaller trees between 10 and 25 metres high. they are dicots,

The systems of land suitability, when applied to areas intended for forest production, have a different diagnoses based on specific criteria and priority for each land use. In analyzing may a forest area under these systems, some aspects are debatable. The system capacity use (Lepsch 1983), despite the ease of understanding and classification by physical attributes, little affected by human intervention, the classification of potential using a conservation focus at the expense of important variables, to achieve satisfactory productivity such as soil fertility. Silvicultural practices, management of settlement and land are not considered viable to improve the restrictions, in some systems. The S.C.A.A.T. (Oliveira & Sosa 1995) considers land use inherent risk of impact due to the proposed management, and this excludes the use of areas with strong slope for corrugated silvicultural use, even with advanced management (C level) by not showing satisfactory performance of the machines. Decomposition of the factors, instead of grouping the variables according to the nature of the restriction on productivity make it difficult to assess specific limiting factors or recommend practices for improvement. Development based on the characteristics of a region may be used to classify the land to be restricted to agriculture or as suitable for use exclusively as pastoral land or forestry.

Most systems for assessing land suitability used primarily the establishment of agricultural crops, so the classification methodology reflects this direction. The methodology proposed in S.A.A.A.T. is no different, it refers to annual crops grown successively in short cycles, dividing suitable land into subgroups according to the level of crop management, widening the areas suitable for forestry, and recognizing only the intermediate technological level (level B) and viability of improvement. The application of this system becomes ineffective when the reason for investment in forestry, especially with regard to the level of fertility and topographic conditions (Gonçalves 1988) that directly relate to machinery, erosion, soil depth and drainage conditions. The Evaluation System of Agricultural Capability of Lands, recommended by Ramalho Filho & Beek (1995), was initially for the cultivation of grains according to the needs of the time it was developed in the 70s. The areas classified in this system as suitable for forestry purposes, assume a middle management level (level B) and have limitations that make it impractical for use with annual crops. The point of greatest restriction on the use of silviculture, in this system is the lack of oxygen, followed by water scarcity, impediments to mechanization, fertility, and finally susceptibility to erosion. Incompatibility in adopting this system for forest production occurs in the first instance in the area evaluated by SAAAT Most of the production forests of the country are large plantations in areas with high capital investment, which together with research and technical knowledge, in genetic improvement, technology exploitation and silvicultural practices in the conduct of the stands, set the industry at a high technological level, so level C and not B. The redefinition of indicators of the capacity of land for the cultivation of eucalyptus is justified because of the particular behavior shown by species of the genus in relation to the characteristics of the environment, and economic importance to the forestry sector in the country.

Conclusions

Although there are several methods for assessing the suitability of the land, to date there is no recommended technique and technology for plantations of eucalyptus. The use of factors of production parameters and relevant to management systems of high technology, can provide a better assessment of the suitability of land for plantations. Research to provide data on the behavior of the species, according to the intensity of land use throughout the production cycle in conjunction with the use of appropriate methodology for understanding the integration of physiographic and edaphic factors and the effect on the productivity of stands eucalyptus, are necessary to substantiate the proposed considerations.

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