WebPanel 1. Defining pasture carrying capacities for different regions within the Brazilian state of Espírito Santo

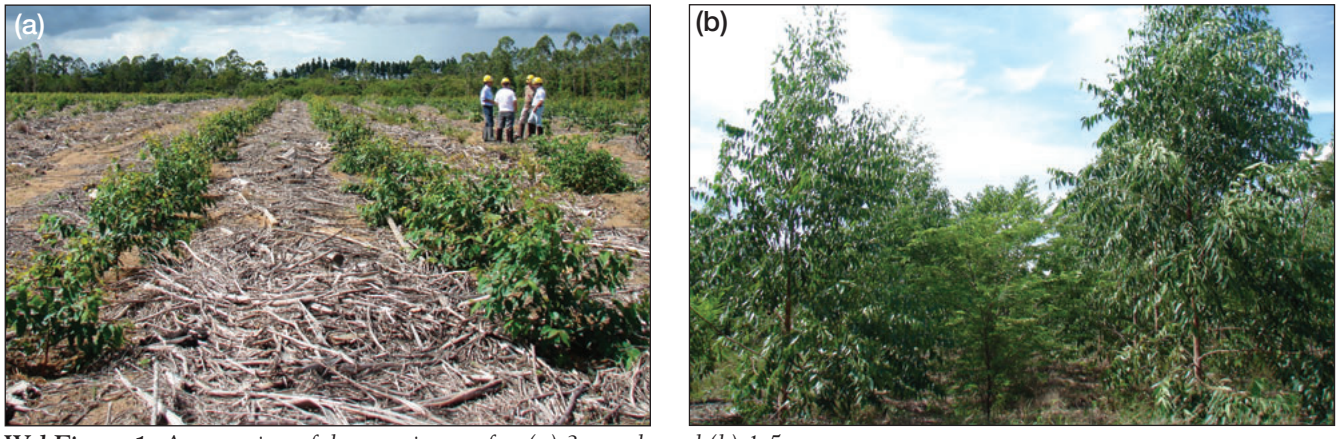
State-level analyses of future possible competition for land in Espírito Santo were conducted in three stages. First, we interviewed representatives of the agricultural and environmental state departments, including Secretary of State for Agriculture, Food Supply, Aquaculture and Fisheries (Secretaria de Estado da Agricultura, Abastecimento, Aquicultura e Pesca), Secretary of the Environment (Secretaria do Meio Ambiente), Research Institute of the State of Espírito Santo, Technical Assistance and Rural Extension (Instituto Capixaba de Pesquisa, Assistencia Tecnica e Extensao Rural), and Agribusiness Development Centre (Centro de Desenvolvimento do Agronegócio) to gather the best available data on land use. Second, we analyzed recent literature and collected data regarding the current situation and future projections of land use in the state. Information on the current levels of cattle productivity was obtained from the Brazilian Institute for Geography and Statistics (Instituto Brasileiro de Geografia e Estatística and Instituto Jones dos Santos Neves, in Portuguese). Finally, we compared actual and potential pasture productivity in the state (estimated using information from the Food and Agriculture Organization and the International Institute for Applied Systems Analysis) and assessed potential future competition for land given the state's agricultural development and restoration plans.

WebPanel 2. Testing a profit-based forest restoration model in Espírito Santo

The Atlantic Forest Restoration Pact's Research and Technology Working Group established in June 2011, in the municipality of Aracruz (19°43′54″S, 40°05′33″W), set up a preliminary experiment to test the ecological and economic suitability of using *Eucalyptus* as an "economic pioneer tree" in restoration plantings. The experiment also investigated the use of valuable native timber species for mid- to long-term cycles of timber harvesting, to obtain income from forests undergoing restoration (WebFigure 1).

The experiment consisted of eight treatments, set within 30-m × 72-m plots, in randomized blocks with five replicates (total area of 11.2 ha). We used 40 native tree species, including some with very high market prices such as Brazilwood (*Caesalpinia echinata*) and Bahia rosewood (*Dalbergia nigra*) – species that are currently threatened by overexploitation and are no longer harvested from native forests. The wood of these species is in high demand for producing musical instruments, and no other types of wood can be substituted (today, companies producing musical instruments, especially violin bows, obtain Brazilwood from the demolition of old farmhouses constructed with this type of wood). These trees could therefore be very profitable in the future.

The experiment also examined whether planting *Eucalyptus* (a *Eucalyptus urophylla–Eucalyptus grandis* hybrid) as a "commercial pioneer tree" could help reduce planting costs, given that the species' seedlings are much less expensive than native tree seedlings, and their rapid growth can accelerate soil shading, thereby reducing the costs of controlling invasive grasses. The experiment finally tested the potential to generate income through the exploitation of *Eucalyptus* timber 6 to 7 years after planting (*Eucalyptus* timber has many uses – including pulp production, firewood, construction, and fence posts – and has a well-established market in the region). Therefore, the use of *Eucalyptus* as a "commercial pioneer tree" may be sufficient to recover restoration costs and maintenance, and the exploitation of valuable timber species could generate high profits for landowners starting 20 years after planting. Projections based on early field observations indicate a positive internal rate of return of 11.7% over 40 years, a substantially higher rate of return than that of cattle ranching (which averages around 4%; Strassburg *et al.* 2014). Tropical forest restoration may therefore constitute a more economically attractive land use to farmers than cattle ranching in low productivity pasturelands.



WebFigure 1. *An overview of the experiment after (a) 3 months and (b) 1.5 years.*

WebReferences

Strassburg BBN, Scaramuzza CA de Mattos, Sansevero JBB, *et al.* 2014. Análise preliminar de modelos de restauração florestal como alternativa de renda para proprietários rurais na Mata Atlântica. Rio de Janeiro, Brazil: International Institute for Sustainability. The report is available on request; please contact the corresponding author at b.strassburg@iis-rio.org