

de conversão de 0,8 é uma alternativa prática e genérica para a obtenção do dap a partir do dat para as florestas com maior presença de *Araucaria angustifolia* em sua composição. Nas florestas com maior quantidade de angiospermas o melhor ajuste foi com o modelo linear simples completo $\text{dap} = 3,7842 + 0,7661 \text{ dat}$.

Is the seed rain sufficient to passive restoration areas?

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Passive restoration has been used as a strategy for the restoration of ecological corridors of native vegetation in forest plantations. Ecological filters restrict the dispersal, formation and maturation of a natural community and knowing them allows them to be manipulated to reassemble the desired native community. The objective was to test the hypothesis that the passive restoration of ecological corridors can be limited by the low arrival of propagules through the seed rain. The study consisted of three ecological corridors ranging from 1 to 2.6 km in length. In each one, 36 plots of 400m² were drawn, at distances varying from 24 to 790 m from the edge of the nearest fragment. In each plot were installed four circular collectors of 0.25 m², totaling 144. The collection was performed monthly, during 12 months. Most of the seed rain species were autochthonous (from trees already established in the corridors themselves). The abundance and richness of seed rain of the tree species decreased significantly with the increase of the distance of the fragment, showing the existence of a dispersion filter for these species in these corridors. Although the propagules arrive in significant quantities in the areas, the passive restoration does not occur properly, due to the large amount of grasses present in the corridors and the presence of the dispersion filter in the places near the fragments of the surroundings. The addition of aloctones propagules should increase the permeability of this filter, however, this would only work if there were control of the amount of grasses.

Forest degradation and effect on water resources in Aravali Mountains of Haryana, India

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Aravalis are the oldest mountain chain in the world. The range of these mountains falls under arid and semi-arid regions of India in the states of Gujrat, Rajasthan, Haryana ending in national capital Delhi. The best forests of these mountains comprise of *Annogeissus pendula* and its associates. But now most of the forests have been invaded by *Procopis juliflora*. Fuelwood collection, grazing and invasion by *Procopis juliflora* are major causes of forest do. Lots of regular water streams and falls used to be there in Aravalis of Haryana State. But due to degradation of forests, the water in most of the streams have dried and others the discharge has come at a point of extinction of these water streams or falls. An analysis of these water resources of Haryana Aravalis will be presented.

DIQ: AGROFORESTRY FOR ECOSYSTEM SERVICES

Estimating carbon storage by tree in an integrated agriculture production system in a protected area in the Brazilian subtropic / Estimativa de sequestro de carbono por árvores em um sistema integrado de produção agropecuária em área de proteção ambiental no subtropical brasileiro

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Florestas e árvores sequestram carbono e são componente chave em relação às mudanças climáticas, em termos de mitigação e resiliência. O setor de Agricultura, Silvicultura e Uso da Terra é responsável por quase 25% emissões antropogênicas de gases de efeito estufa, principalmente pelo desmatamento, manejo de gado, solo e nutrientes. Foi conduzido um experimento na Estação Experimental da Universidade Federal do Paraná (Pinhais, PR), com árvores de *Eucalyptus benthamii*, plantadas em 2013 no espaçamento de 14 X 2m (357 árvores/ha) integradas com pecuária (PF) e com lavoura-pecuária (LPF). As desramas foram feitas aos 21 e 33 meses; aos 44 meses fez-se o desbaste, diminuindo a densidade para 156 e 147 árvores/ha, respectivamente para PF e LPF. Aos 56 meses de idade as árvores apresentavam volume individual médio de 0,30 m³ para PF e 0,34 m³ para LPF, fixando 0,31 tCO₂ e 0,34 tCO₂, respectivamente. Com base no fator de emissão de metano entérico de 56 kg/animal/ano, parametrizado pelo IPCC para bovinos de corte, foi estimada a mitigação realizada pelas árvores, são necessárias pelo menos 4 árvores para mitigar a emissão de um bovino de 450 kg (UA). Cada hectare dos sistemas estudados pode mitigar a emissão de metano de pelo menos 36 UAs. No ciclo de 2017/18, os sistemas PF e LPF suportaram carga animal de 1,7 UA/ha e 1,4 UA/ha, com emissão estimada em 2,2 tCO₂/ha e 1,9 tCO₂/ha, contra o sequestro médio anual nas árvores de 7,9 tCO₂/ha e 8,6 tCO₂/ha, respectivamente.

Agroforestry-based application of microbial inoculant for sustainable upland forest farms in the Philippines

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Ecological balance is necessary for productive agroforestry system where beneficial microbes can function in improving growth, biomass, harvest, and carbon sequestration. This paper demonstrated the importance of indigenous microbial inoculation through community-based approach in nursery and agroforest production to reduce usage of chemical fertilizer while enhancing growth and simultaneously improve livelihood potentials in uplands near mountainous ecosystem in Southern Luzon, Philippines. Local isolates of beneficial bacteria and endomycorrhizal fungi were obtained from rhizosphere of nine agroforest crops (*Mormodica charantia*, *Solanum melongena*, *Cucurbita maxima*, *Abelmoschus esculentus*, *Capsicum baccatum*, *Vigna unguiculata*, *Solanum lycopersicum*) that were traditionally raised as ingredient for nutritious native dish planted with *Theobroma cacao* and *Coffea arabica*. These high value crops are commercially known around the urbanized region where woody perennials were maintained as forest cover to favor soil, microclimate, and carbon sequestration. Microbial isolates were described, purified, mass-produced with *Centrosema pubescens* and *Leucaena leucoccephalla* as hosts, and tested in nursery and field growth performance following standard procedures. Effects of inoculant were significant ($p < 0.05$) in improving parameters (eg. height, diameter, biomass, yield) of selected crops. Combining inoculant with farmers practice increased crop production by about half and prolong generally lifespan