Standard for planning and executing restoration processes with a forestry landscape approach

Elizabeth Bustos[1], Roger Villalobos[1], Fernando Carrera[1], Diego Delgado[1]
[1]CATIE, Turrialba, Costa Rica (elizabeth.bustos@catie.ac.cr; rvillalo@catie.ac.cr; fcarrera@catie.ac.cr; ddelgado@catie.ac.cr)

Although the restoration of landscapes is a concept used more and more frequently in the literature and is mentioned in international discussions and commitments, there are still many doubts about how to organize and execute forest landscape restoration processes. Model forests are cross-sectoral social platforms of governance for large forest landscapes, in which there are diverse agricultural, forestry, urban or industrial land uses; various forms of tenure, social groups, interests and values. The partners of the Ibero-American Model Forest Network have been promoting, or wish to promote, restoration processes with a landscape approach in their areas of influence. That is why, from the analysis of processes and the discussion with managers of 4 Model forests, in Peru, Colombia and Costa Rica, a standard was developed to guide the development of productive restoration of forest landscapes. This standard consist of five principles. The first one refers to the ordering of the restoration actions themselves, the second to the political and institutional conditions that are required, the third to the conditions of local governance, the fourth to the availability of financial resources and market conditions, the fifth to the structures required for the process to be adaptive, including ongoing monitoring and evaluation. These principles are divided into 19 criteria and 51 possible indicators, which must be adapted to each particular situation.

Effect of the application of sewage sludge on the foliary contents of B, Cu, Fe, Mn and Zn in native species of the Atlantic Forest

Pedro Henrique Proença Nalesso[1], Rafael Barroca Silva[1], Marianne Fidalgo de Faria[1], Livia Mara Lima Goulart[2], Iraê Amaral Guerrini[1]
[1]Universidade Estadual Paulista "Júlio de Mesquita Filho", Botucatu, Brasil; [2]IFRR, Novo Paraíso, Brasil (pedronalesso@hotmail.com; rafael.barroca@outlook.com; marianneffaria@hotmail.com; liviamlgoulart@yahoo.com.br; irae.guerrini@unesp.br)

Sewage sludge is a source rich in organic matter and nutrients, being an alternative for the recovery of degraded areas. The objective of this study was to evaluate the effect of sewage sludge on the micronutrient foliar content of native Atlantic Forest species after 10 years of application of the residue. The experiment was set up in 2005 on the farm Entre-Rios,in the region of Itatinga-SP, Brazil. The experimental area was divided into 32 plots where 9 native species were planted. The experimental design was randomized blocks with four replications, considering the five increasing doses of sludge (2.5; 5; 10; 15 and 20 t ha^{-1}) with supplementation of K; mineral fertilization; dose of K used as supplementation and control, totaling 8 treatments. In 2015, leaves of three species (aroeira-pimenteira, canafístula and copaíba) were harvested, for subsequent evaluation of the micronutrient content. The data were submitted to analysis of variance and the means were compared by the Tukey test at 5%. It was observed a significant effect of the sewage sludge on the foliary contents of B, Fe, Mn and Zn for aroeira-pimenteira, Cu, Fe and Zn for canafístula and Fe and Zn for copaíba. The highest mean values of leaf contents for micronutrients were found in the highest doses of sludge and in mineral fertilization. In general, the doses of sewage sludge provided higher leaf contents of B, Cu, Fe, Mn and Zn for the species studied in relation to mineral fertilization.

Priority areas for forest restoration after Geographic Information Systems in Paraguay's San Rafael National Park Reserve */ Áreas prioritarias para restauración forestal desde los Sistemas de Información Geográfica en la Reserva para Parque Nacional San Rafael, Paraguay*

Fabiana Miranda[1], Stella Mary Amarilla[1], Janet Villalba[1], Lourdes González[1]
[1]Universidad Nacional de Asunción, San Lorenzo, Paraguay (fabianamgaray@gmail.com; stella.amarilla@agr.una.py; janetvv@gmail.com; lourdesg.spy@gmail.com)

Debido a la necesidad de estudios referidos al tema de la degradación y restauración de ecosistemas en Paraguay; se ha considerado importante evaluar áreas prioritarias para la restauración forestal en la Reserva para Parque San Rafael (RPSR) reconocida tanto por su importancia para la conservación, como por sus procesos de degradación históricos, siendo este tema el objetivo general de la investigación. La RPSR ubicada entre los departamentos de Itapúa y Caazapá es considerada un remanente boscoso representativo de la ecorregión Bosque Atlántico del Alto Paraná. La metodología se basó en la priorización espacial de criterios relacionados a la restauración de bosques a través de Sistemas de Información Geográfica. Se utilizaron imágenes satelitales Sentinel 2-A, cartografías temáticas y herramientas ArcGis 10.3 y QGIS 2.18. Se aplicó una evaluación multicriterio, con la cual se combinaron 14 capas de información para obtener el mapa final de áreas prioritarias para acciones de restauración forestal. Los resultados indican que la categoría máxima prioridadde restauración representa el 7,03% y la categoría alta prioridadel 17,86%, ambas ubicadas en la zona Oeste del área protegida. Esta investigación buscó facilitar información para futuros proyectos de restauración forestal y otras acciones de manejo y conservación, oportunamente enmarcados en la declaración de la Década de las Naciones Unidas para la restauración de los ecosistemas (2021-2030).

Structural heterogeneity and tree species mixing as basis of climate smart forest management

Hans Pretzsch[1]
[1]Chair for Forest Growth and Yield Science, Center of Life and Food Sciences Weihenstephan, Technical University of Munich, Freising, Germany (hans.pretzsch@lrz.tum.de)

Firstly, this talk will give an overview of the species' interactions and growth reactions in mixed-species stands under chronic and acute drought. In the second part, the species-specific mixing reactions on drought are traced from the stand to the species, tree and organ level. A focus will be on drought stress effects on the growth, partitioning between the trees of different species and sizes in a stand. Thirdly, the mixing reactions on drought are analyzed in dependence on site conditions and stand structure. Fourth, we show how the results can be applied to design drought tolerant mixed-species stands. Fifth, the next steps for research and implementation will be discussed: Mixed-species experiments along environmental gradients, experiments with water retention for a better understanding of species stress behaviour in intra- and inter-specific environments, process-based models for scenario analyses, and guidelines for the design of drought tolerant forest stands. The results are based on the EU funded projects REFORM (Mixed species forest management. Lowering risk, increasing resilience # 2816ERA02S) and COST CLIMO (Climate-Smart Forestry in Mountain Regions # CA 15226).