

loss. Mexican forest policy encourages ex situ and in situ conservation of forest genetic resources. But work remains to be done for sufficient protection of populations and genetic resources of species under harvest for their long term sustainability. This presentation reviews long term viability and results for various ex situ trials and seed banks for mahogany and Spanish cedar in the Yucatan, especially for the 1996-1998 trials in Quintana Roo. Of two trials of mahogany and two trials of cedar established on community and private lands, only one remain of each. The remaining trials are being converted to seed orchards in Spring 2020. Also considered is the current status of in situ seed stands for these species, and the relative usefulness of ex situ and in situ strategies for maintaining genetic resources. In addition, current harvest policy and possible modifications for better maintenance of populations and genetic variation are considered.

### Management of natural regeneration of *Araucaria angustifolia* in small farms in Southern Brazil: an alternative for the conservation of the species

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*Araucaria angustifolia* (Bert.) O. Kuntze occurs naturally in south and Southeastern Brazil. It has cultural and ecological significance as its seeds are traditionally consumed by local communities and are an important source of food for wildlife. It also has multiple potential uses for timber, paper, and the food industry. Its exploitation is forbidden by law and it is currently listed as critically endangered. Because of legal limitations, regrowth of araucaria trees is seen by landowners as problematic, thus inducing seedling removal. One way to promote its conservation is taking advantage of traditional agroforestry productive systems such as caívas and faxinais that integrate animal husbandry, erva-mate (*Ilex paraguariensis*), and other crop production in forested areas. Under these conditions, araucaria regeneration is abundant and can be managed for productive and conservation goals. We analyzed two examples of such agroforestry systems and confirmed the potential for maintaining high levels of forest diversity, income generation through livestock and erva-mate production, combined with important regeneration of araucaria. In one area we observed a predominance of *Araucaria* (48%) along with 46 other species, and *Araucaria* plants were distributed in various DBH classes. In the second property, we observed that *Araucaria* abundance corresponds to around 13% of the forest with a higher representation in larger DBH classes (up to 86%) while maintaining a diversity of 44 tree species. Overall, despite its economic potential, the species continues to be a poorly understood resource with limited interest in establishing plantations and maintaining natural stands.

### From disaster to opportunity: examining the effects of hurricanes Irma and Maria on mahoganies in Puerto Rico and U.S. Virgin Islands, related policy responses, and potential for enhancing long-term sustainability

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In September 2017, two major hurricanes – Irma and Maria – passed through the Caribbean, resulting in significant loss of life, impacts on local economies, and effects on natural resources. Large areas of forest were nearly to completely defoliated and countless trees were uprooted, snapped, or damaged in natural to urban settings. Tree damage and death occurred throughout the islands, including high-value species, such as big-leaf, small-leaf, and hybrid mahoganies. These species are not native to Puerto Rico or the U.S. Virgin Islands, but have become naturalized with extensive planting since they were first introduced in 1790. Although significant volumes of hurricane-downed mahoganies and other timber species were collected in debris removals as part of the response and recovery efforts in Puerto Rico and the U.S. Virgin Islands, very limited volumes were salvaged for timber and other products, due in large part to limited industrial capacity for wood transformation as well as limited foresight or policy coherence on disturbance-downed wood. The local economic loss has been estimated at millions of dollars. We examine the effects of the 2017 hurricanes on planted and naturalized mahoganies in Puerto Rico and the U.S. Virgin Islands and the related short and long term management and policy responses. We discuss the implications for the sustainable management and use of these high value species, in the context of islands searching for solutions that increase resilience and decrease dependence on imports, including wood products, and which face a likely future of more severe and frequent storms and hurricanes.

### *Araucaria angustifolia* breeding program at Embrapa Florestas

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*Araucaria angustifolia* (Bert.) O. Ktze is a native species from Brazil which plays as important social and economic role, especially in the southernmost region of the country. Currently it is threatened on extinction, and consequently its remnants cannot be exploited. Conservation by use is one feasible way to conserve this tree through plantations ensuring adequate variability. However, the seed supply with high physiological and genetic quality to this plantation is a major problem which could be overcome through breeding programs. Embrapa Florestas (CNPq), together with Instituto Florestal de São Paulo (IF-SP) started a breeding program nearly 40 years ago as provenance/progenies tests, covering a wide natural area. As *Araucaria* occurs in an over a wide geographical region, southern and Southeastern Brazil, differences between them must be considered in breeding and conservation programs. The introduced tests were submitted to a thinning of 50 % intensity. From recombining of the remaining trees seeds a second generation provenance/progeny tests were established in Curitiba-SC, Ponta Grossa-PR, Caçador-SC, and Monte Belo do Sul-SC. Consequently, a higher productivity gain is expected in relation to the current seed sources. Moreover a participatory improvement is being considered aiming to promote the increasing of variability and the development and use of adapted germplasm to specific conditions. For this purpose a cooperative araucaria breeding project is being implemented among Embrapa Florestas and partners aiming to develop genetically improved seeds and clones of araucaria, based on a wider genetic base to ensure the potential for genetic improvement for consecutive generations.

### Threatened by conservation: addressing policy gaps for the maintenance of high-density Brazil nut tree clumps

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Considered a cornerstone species in Amazonian forest conservation strategies, the Brazil nut enjoys a unique status. It is immune to cutting and most of its distribution is under some category of protected area. Nonetheless, both nut-gatherers and researchers consistently report insufficient natural regeneration