Agroforestry Suggestions Based on Climatic Modeling

Indigenous agroforestry systems have been practiced for centuries in the Himalaya Mountains and adjoining regions. With the increase of climate change associated risks, enhanced understanding of the impact of climate change and related phenomena on the potential distribution of agroforestry is increasingly useful and necessary, for both maintaining and improving yield and ecosystem function. In particular, increased understanding of these issues is crucial to identify both "*how*" and "*where*" efficient and systematic response mechanisms can be developed in advance to provide an array of adaptation options. Choosing the appropriate tree crop for current and future suitable locations is a first important step and primary aspect in developing agroforestry systems that would meet regional needs for adaptation, mitigation and ecological restoration.

Dr. Sailesh Ranjitkar, Prof. XU Jianchu and their coworkers at the CAS Kunming Institute of Botany studied spatial distribution of ten agroforestry potential species in the Yunnan Province of China. They aimed to find the right agroforestry species to promote at right place and the mixed agroforestry system using selected species. They used a multi-model ensemble approach based on ecological niche modeling to understand the impact of climate on distribution of agroforestry trees in Yunnan. The models generated in the study explained suitable habitat, and identified potential locations for mixed agroforestry. Model suggested west and southwest Yunnan as important location for tea and alder-based agroforestry, while southern parts of Yunnan suited for tea and hog, and northern parts could support walnut-based agroforestry options.

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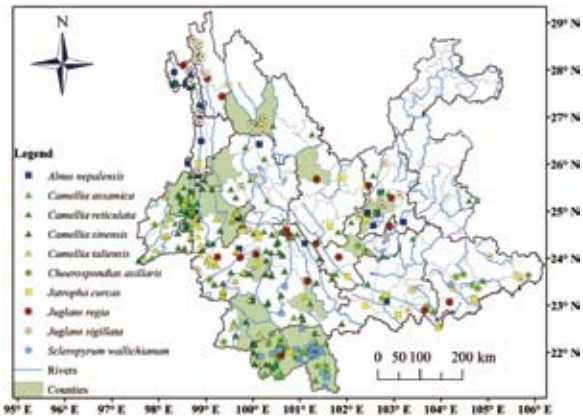
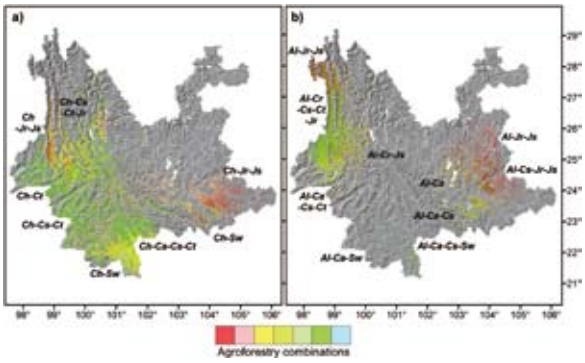


The study area showing the location of the 10 focal species; the occurrence locations were based on the herbarium specimens, available literature and field observations (highlighted counties).



Climatically suitable zones for mixed agroforestry in Yunnan with a) *Choerospondias axillaris* and b) *Alnus nepalensis* as shade trees in the future climate based on fuzzy logistic matching of all future prediction layers. *An* refers to *Alnus nepalensis*, *Ca* – *Camellia assamica*, *Cs* – *C. sinensis, Ct* – *C. taliensis, Chs* – *Choerospondias axillaris*, *Jr* – *Juglans regia*, *Js* – *J. sigillata* and *Sw* – *Scleropyrum wallichianum*.