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Developing a tree species selection model using native trees for urban heat island mitigation in Tagum city

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The detrimental effects of the urban heat island phenomenon in cities across the Philippines inspired planners to use urban trees to mitigate their impacts. As a key strategy, native tree species were used to maximize environmental benefits. Localized tree species selection addressed the issues of a specific urban setting, yet no such model was established in the country. With this, the study aimed to develop a comprehensive Tree Selection Criterion and a recommended list of native tree species suitable for street planting in Tagum City, addressing the area's specific challenges of urban heat mitigation. The research employed a concurrent embedded mixed method design that was divided into three sections: (1) determination of the considerations in selecting street trees for urban environments, (2) creation of Tree Selection Criteria with weighted factors using an Analytical Hierarchy Process (AHP) through an expert survey, and (3) investigation of the effect of the selected native trees using an ENVI-met simulation software. The study's results presented five (5) main criteria and twenty-two (22) sub-criteria. Ecological effects and factor canopy density were the top priority for selecting trees. Bani (*Millettia pinnata* (L.) Pierre) was the most preferred native tree species. In the simulation, adding closed-canopy trees could provide a maximum potential air temperature difference of 0.48°C and a mean radiant temperature reduction of 6.29°C. The wider the canopy shade, the more significant the temperature reduction. This research provided a valuable model for other cities with similar challenges, highlighting the significance of selecting native tree species and maximizing their benefits.