Assessing the Climate Resilience/Vulnerability of Tree Species

One of the main aims of the Atlas of Climate Resilient Tree Species (ACResT) is to collect information on a range of tree species that will help evaluate their suitability for planting in urban environments under future climate conditions in Malaysia. This document contains information to help guide assessors through the process of answering the climate resilience/vulnerability questions.

Since the assessments will be based on the knowledge and experiences of experts (you!), the information does not need to come from a published source (although it is okay if it does!). Some things to think about when answering the questions:

- Are there already studies that evaluate the species in the context of climate change? If yes, then these should be your first source for collecting information.
- Have you ever observed the species (in the wild or a planted setting) experience any of the climate/weather events mentioned in the questions? How did the species cope?
- What are the general habitat and other ecological requirements of the species? Do these suggest that the species is able to tolerate the types of climate/weather events mentioned in the questions? Guidance for planting or cultivation, e.g., from gardening books or websites, could provide this information.
- What is the extent of the species' global range, and why? Does this information help you to infer resilience/vulnerability to any of the climate/weather events mentioned in the questions?
- Are there closely related species that are functionally/ecologically similar? Can you use this information to infer resilience/vulnerability to any of the climate/weather events mentioned in the questions?

Guidance Notes on Climate-related Questions

Does this species have specialised habitat requirements? Yes/No/Unknown

This question is a 'catch-all' to help you think about the ecology and requirements of the species. It is intentionally broad, allowing you the freedom to consider any aspects of the species' habitat requirements that you feel are relevant. These may overlap with previous or subsequent questions, which is fine.

Does this species occur/survive in habitats prone to saltwater intrusion? Yes/No/Unknown

Consider the entire range of the species and all habitats in which it occurs. Are any of these prone to saltwater intrusion and/or salt spray? How does the species cope when this happens?

Does this species occur/survive at locations that experience high temperatures (e.g., those exceeding the national average)? Yes/No/Unknown

Consider the entire range of the species, including wild and planted locations. Does this include areas that can reach extreme high temperatures? Have you observed this species growing during a period of extreme heat? If yes, how did it cope?

Can this species tolerate inundation for ≥1 month? Yes/No/Unknown

Consider all habitats with which the species is associated. Do these include habitats known to experience floods and/or soil waterlogging? Have you observed this species growing in areas that have become flooded or waterlogged? If yes, how did it cope?

Can this species tolerate water absence for ≥1 month? Yes/No/Unknown

Have you ever observed the species after a period of drought or prolonged rainfall absence? If yes, was the species badly affected? Does the species' range (wild or planted) include areas known to regularly experience droughts or prolonged periods of rainfall absence?

Can this species tolerate storm conditions (e.g., strong winds)? Yes/No/Unknown

Have you ever observed the species during or after a severe storm? If yes, was the species badly affected? Is the species known to survive in locations that experience conditions typically associated with storms? Also, consider the physical structure of the species (type of wood, leaf size, physical shape etc.); does this suggest an inability to tolerate severe storms?

Note that we are interested in both:

1. Species that may be damaged by storms but not necessarily killed, e.g., softwood species with large leaves may lose branches in high winds – which is undesirable in an urban setting; and
2. Species susceptible to storm-related mortality, e.g., wide-crowned, shallow-rooted species, are more easily uprooted in high winds.

Please indicate if the species is vulnerable to damage and/or mortality in your comments for this question.

Does this species have specific humidity requirements? Yes/No/Unknown

Consider the entire range of the species and all habitats in which it occurs. Do these span areas that vary in their relative humidity? Consider the species' altitudinal range; does it span altitudes that differ in atmospheric humidity, or is it confined to areas with specific humidity conditions? Cloud forest trees provide a somewhat extreme example of species with specific humidity requirements.

Is this species highly prone to predation, parasitism, and/or disease? Yes/No/Unknown

Whether in a wild or planted setting, consider whether the species is known to experience interspecific interactions that can severely affect the survival of individuals or populations. It is crucial to record the type(s) of organisms that can cause these effects.

Please provide any additional information for this species in the context of climate change resilience and/or vulnerability.

This last section allows you to provide thoughts on any aspects that you feel may not have been covered in the previous questions. You may also want to clarify or expand upon any of the topics covered earlier, e.g., if two or more aspects of climate change are likely to act in synergy when combined. We encourage you to provide any thoughts or information that you consider relevant.