Botanical Survey
OF THE TREES AND SHRUBS OF
Uhuru Garden

Mombasa City, Mombasa County, Kenya - June 2025

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The survey is part of a collaboration with Together4Climate, a youth-led Community Based Organization led by Basil Angaga, a Mandela Washington Fellow working for more sustainable cities and resilient communities.

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Straw-coloured fruit bats roosting in a tree in Uhuru Garden. A migratory species, they are not permanently in residence. Photo supplied by Paul Webala. People sit and stroll in a well-treed section of the Garden, and a small food vendor plies her trade. Photo KENBAT

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Summary

In the city of Mombasa, from June 5 to 8, the wet season at Kenya's coast, the flora of Uhuru Garden was subjected to a comprehensive botanical survey. The goal was to establish a botanical baseline for the historical 1.1-hectare green space. The task was to document the diversity of tree and shrub species, estimate their abundance, and classify the vegetation. The exercise entailed systematically surveying the entire area to record trees and shrubs. It also identified the species of two trees felled in the Garden on 30 May 2025

A total of 143 individual trees and shrubs were counted and 55 tree and shrub species identified. The Uhuru Garden ecosystem was found to be home to at least four rare and threatened trees: *Mkilua fragrans, Cynometra suaheliensis, Milicia excelsa* (Mvule), and cycad *Encephalartos hildebrandtii.* Also present were five other important trees from Kenya's beleaguered coastal forest biome: *Rauvolfia mombasiana, Ficus sansibarica, Ficus bussei, Majidea zanguebarica,* and *Afzelia quanzensis.*

Of the 55 species identified, 16 were indigenous and 39 were exotic. While the focus in this epoch of biodiversity loss and climate crisis is on indigenous species, the survey team noted that large exotic trees were also providing important ecosystem services. These include the two that were cut – a mango (*Mangifera indica*), a naturalized species in Kenya originally from Asia, and a tree from mainland Southeast Asia and northern Australia (*Peltophorum pterocarpum*). This report strongly urges that all large mature trees be protected.

Uhuru Garden is one of the few designated green spaces in Mombasa and a contributor to the mental and physical health of city inhabitants. It provides shade in the context of increasingly extreme heat. It is also a space to exercise and therefore a bulwark against non-communicable diseases such as coronary heart disease and diabetes. A critical repository of nature, it is among the last remaining roost sites for the Near Threatened straw-coloured fruit bat (*Eidolon helvum*).

This report outlines threats to Uhuru Garden and details ways forward to maintain, protect and improve it. The survey team advises that:

- future planting incorporate species from Kenya's coastal forest, especially those that are endangered, thereby transitioning the Garden to a native coastal species refuge.
- that decisions to remove a tree include an environment impact assessment and be based on a process that is consultative and reflects the latest scientific understanding of tree growth and health, including that hollow trees can be structurally strong and older trees are naturally colonized by a wide array of organisms that create veteran tree habitats. (National Tree Safety Group, 2024)
- that the likelihood of tree-related hazards to people be reduced by good silvicultural practices, and, when storms and high winds are forecast, by closing the Garden and broadcasting advisories to the public not to enter.

According to the Kenya Bat Conservation Network in 2018, approximately 16,000 straw-coloured fruit bats roost on 18 large trees in Uhuru Garden. Photo by KENBAT

Objectives

- Carry out a comprehensive plant diversity survey
- Georeference the trees and shrubs
- Identify and mark species of conservation concern
- Identify trees susceptible to breakage
- Recommend indigenous tree and shrub species for replacement of the felled trees
- Outline threats to the ecosystem and suggest management strategies
- Establish baseline data for future comparative studies and monitoring
- Contribute to a win-win-win way forward for a vital city forest and green space

Methodology

Tree and shrub diversity documentation involved an intense search until no additional species could be identified. Vegetation types were assessed by studying the species composition and vegetation structure across 13 sampled areas. A handheld Global Positioning System (GPS) device was used to obtain the grid reference. From each sample point on the grid, trees and shrubs were counted and identified within a 5 to 7m radius. Trees and shrubs of conservation concern, including rare and threatened species, were determined using information from International Union for Conservation of Nature (IUCN) and the Convention on International Trade in Endangered Species (CITES) databases. Plant specimens were collected for further identification and preservation at the East African Herbarium. Photographs of trees and shrubs were taken for further identification and reporting.

Study area

Study area with the 13 sample points around which a search for tree and shrub species was conducted in a radius of 5-7 m.

Table 1: Sample points and their georeferences

Sample points	Georeference (Latitudes and Longitudes)	Sample points	Georeference (Latitudes and Longitudes)
P1	S 04.06129° E 39.66657°	P8	S 04.06099° E 39.66581°
P2	S 04.06104° E 39.66655°	P9	S 04.06125° E 39.66604°
P3	S 04.06094° E 39.66634°	P10	S 04.06109° E 39.66621°
P4	S 04.06090° E 39.66620°	P11	S 04.06136° E 39.66632°
P5	S 04.06066° E 39.66654°	P12	S 04.06136° E 39.66618°
P6	S 04.06074° E 39.66595°	P13	S 04.06135° E 39.66571°
P7	S 04.06067° E 39.66585°		

Results

Species diversity and composition

Sampling 281 trees and shrubs, a total of 55 species belonging to 21 families and 48 genera were recorded. Of these, 46 were trees and nine (9) were shrubs. Of the 55 species identified, 16 (29%) were indigenous to Kenya and 39 (71%) were exotic. The Fabaceae (Legume family) had the highest diversity with nine (9) species representing 16% of 55 species. This was followed by eight (8) species in the Arecaceae (Palm) family, seven (7) species in the Moraceae (Fig) family, and five (5) species in the Apocynaceae (Dogbane) family. These four families represented about 53% of the recorded trees and shrubs. The largest genus was Ficus (Fig) trees with six (6) species. The Phoenix (Date) palm genus and Terminalia genus had two (2) species each.

Table 2: Floral habit diversity, number of species and respective percentages

Habit	No. of species	Percentage
Trees	46	84%
Shrubs	9	16%

Species of conservation concern

According to the IUCN, a vulnerable species is one that is "threatened with extinction unless the circumstances that are threatening its survival and reproduction improve". A near threatened species is one is close to qualifying for a threatened category if, for example, its population declines 10% or more in the next ten years.

IUCN Red List database

The survey team recorded four (4) tree and shrub species that are on the IUCN Red List database: one Vulnerable and three that are Near Threatened.

Table 3: IUCN Red List species and their respective status

Family	Species	IUCN Status
Annonaceae	*Mkilua fragrans Verdc.*	*Vulnerable (VU)*
Fabaceae	*Cynometra suaheliensis (Taub.) Baker f.*	*Near Threatened (NT)*
Moraceae	*Milicia excelsa (Welw.) C.C.Berg*	*Near Threatened (NT)*
Zamiaceae	*Encephalartos hildebrandtii A.Br. & Bouch var. hildebrandtii*	*Near Threatened (NT)*

Details of these species are as follows:

- Categorized as Vulnerable, *Mkilua fragrans*, a shrub up to 8 m, is found only in coastal Kenyan, north-east Tanzania near the Kenyan border, and Zanzibar. According to *Useful Trees and Shrubs of Kenya*, it is used for firewood,

posts, medicine (roots), ornamental, perfume, and ceremonial purposes. The genus Mkilua has only this one species native to the East African coast.

- Categorized as Near Threatened, *Cynometra suaheliensis* is a tree or shrub from 5 to 15 metres tall. It is found only in Kenya and Tanzania, has a restricted range and "faces a continuing decline in area, extent and/or quality of habitat", according to a 2008 assessment. Its habitat is dry evergreen and riverine forests and coastal evergreen bushland at elevations from sea level to 150m. Harvested from the wild, the wood is used for stools and grain mortars, building houses, and for fuel and to make charcoal. It can be planted for amenity and to provide shade.
- Near Threatened *Milicia excelsa*, known as Mvule in Swahili and Mvure in Digo and Giriama, is one of East Africa's tallest trees. It has highly prized hardwood.
- Near Threatened *Encephalartos hildebrandtii*, known as Mkwanga in Swahili and Mtaspu in Digo, is one of five cycads found in Kenya where it grows only at the coast in evergreen coastal bushland and dry coastal forest below 30 m asl. It belongs to a group of woody plants, sometimes called living fossils, and is palm-like, reaching 6-9 m. Its kernel can be "boiled, dried and ground into a flour". (Maundu and Tengas, 2005)

A Vulnerable *Mkilua fragrans* (Mkilua) growing in Uhuru Garden Endemic to (found only in) the coastal moist forests of Kenya and Tanzania, it has attractive, relatively large, sweetly scented flowers.

CITES species

Looking at CITES Appendix I, the survey found no species facing "high risk of extinction in the wild". However, under CITES Appendix II, which includes all species of Orchidaceae and of the genera Euphorbia and Aloe; plus species such as *Prunus africana* and *Osyris lanceolata*, one species was recorded as Near Threatened. This was again *Encephalartos hildebrandtii*, described above.

Table 4: CITES species, habit and its respective category

Family	Species	Habit	CITES
Zamiaceae	*Encephalartos hildebrandtii A.Br. & Bouch var. hildebrandtii*	Tree	Appendix II

The Near Threatened (NT) *Encephalartos hildebrandtii var. hildebrandtii* (Mombasa cycad) in Uhuru Garden is one of Kenya's five cycad species. Only present at the coast, it is a CITES protected species under Appendix II.

Invasive tree *Leucaena leucocephala* (*Leucaena*).

Invasive Plants

Invasive plants are introduced non-native or native plants that adversely affect the habitats they invade economically, environmentally and ecologically. The survey recorded two invasive trees in Uhuru Garden. Leucaena leucocephala, which, originally from Central America, is thought to have reached Africa in 1950. Thriving in hot humid conditions and exhibiting "prolific seed production and (an) aggressive root system", it is "invasive in the coastal areas of East Africa," according to CIFOR-ICRAF, 2025. *Azadirachta indica A.Juss.* or Neem or Mwarobaini in Swahili, is a larger tree that poses a challenge for Kenya's coast, spreading by seed dispersed by birds and often forming a tangled mat of saplings that suppresses other trees and can be hard to walk through.

Table 5: Invasive species and habit

Family	Species	Habit
Fabaceae	*Leucaena leucocephala (Lam.) de Wit*	Tree
Meliaceae	*Azadirachta indica A.Juss. Neem*	Tree

Vegetation Classification

Uhuru Garden's vegetation can be classified as a garden, consisting mainly of introduced shrubs and herbs, most of which are exotic. However, a good representation of indigenous trees was found. Records of the original and subsequent plantings of Uhuru Garden have not been located. But it is likely that some of the indigenous tree species were planted. These include *Mkilua fragrans* with four individuals; *Majidea zanguebarica*, a highly decorative tree with black seeds native to SE Kenya to East Tanzania (including Zanzibar), with eight individuals; and *Afzelia quanzensis* with its large black and orange seeds, with three individuals.

However, most of the balance of the 16 indigenous trees and shrubs are likely to have regenerated naturally largely from seed dispersed by birds and bats. Bats are almost certain to have played a particularly important role in bringing in the six species of Ficus (Fig). The seeds of Mvule (*Milicia excelsa*), represented by three individuals in the Garden, are also dispersed by bats.

See Table 6 for the complete list of species found. While biodiversity is considered an attribute of all indigenous species, exotics also play a role in supporting biodiversity as can be seen by the bats roosting in the mango trees. Some African pollinators also visit the flowers of exotic trees and shrubs, and some indigenous birds thrive on the flesh of exotic fruit such as guava and mango.

Finally, almost all the trees, but particularly large mature trees, play a hugely important role in cooling through shade and transpiration. The exception would be small palms.

Table 6: Uhuru Garden tree and shrub checklist

No.	Family	Species	Habit	Status	Comment	IUCN, CITES categories
1	Anacardiaceae	*Mangifera indica L.* Mango	Tree	Exotic	Fruit tree, Bat roost	
2	Annonaceae	*Annona squamosa L.*	Tree	Exotic	Fruit tree	
3	Annonaceae	*Mkilua fragrans Verdc.*	Shrub	Indigenous	Ornamental, biodiversity	Vulnerable (VU)
4	Annonaceae	*Polyalthia longifolia (Sonn.) Benth. & Hook.f. ex Thwaites*	Tree	Exotic	Ornamental	
5	Apocynaceae	*Adenium obesum (Forssk.) Roem. & Schult.*	Shrub	Indigenous	Ornamental, biodiversity	
6	Apocynaceae	*Cascabela thevetia (L.) Lippold*	Tree	Exotic	Ornamental	
7	Apocynaceae	*Plumeria obtusa L.* Frangipani	Tree	Exotic	Ornamental	
8	Apocynaceae	*Rauvolfia mombasiana Stapf*	Tree	Indigenous	Biodiversity, medicine	
9	Apocynaceae	*Tabernaemontana divaricata (L.) R.Br. ex Roem. & Schult.*	Shrub	Exotic	Ornamental	
10	Araucariaceae	*Araucaria cunninghamii Mudie*	Tree	Exotic	Ornamental	
11	Arecaceae	*Adonidia merrillii (Becc.) Becc.*	Tree	Exotic	Ornamental	
12	Arecaceae	*Chrysalidocarpus lutescens H.Wendl.* Golden cane palm	Tree	Exotic	Ornamental,	
13	Arecaceae	*Cocos nucifera L.* coconut palm	Tree	Exotic	Ornamental, Food	
14	Arecaceae	*Elaeis guineensis Jacq.* African oil palm	Tree	Indigenous,	Ornamental, Biodiversity	
15	Arecaceae	*Hyophorbe sp.*	Tree	Exotic	Ornamental	
16	Arecaceae	*Phoenix dactylifera L.* Date palm	Tree	Exotic	Ornamental, Food	
17	Arecaceae	*Phoenix reclinata Jacq.*	Tree	Indigenous, biodiversity	Ornamental	
18	Arecaceae	*Pritchardia pacifica Seem. & H.Wendl.*	Tree	Exotic	Ornamental, Fan palm	
19	Asparagaceae	*Dracaena fragrans (L.) Ker Gawl.*	Tree	Indigenous	Ornamental	
20	Bignoniaceae	*Kigelia africana (Lam.) Benth. ssp. Africana.* Sausage tree	Tree	Indigenous, biodiversity	Biodiversity	
21	Bignoniaceae	*Tabebuia pallida (Lindl.) Miers*	Tree	Exotic	Flowering tree	

No.	Family	Species	Habit	Status	Comment	IUCN, CITES categories
22	Bignoniaceae	*Tecoma stans (L.) Juss. ex Kunth*	Tree	Exotic	Flowering tree	
23	Caricaceae	*Carica papaya L.* Papaya	Tree	Exotic	Fruit tree	
24	Combretaceae	*Combretum indicum (L.) DeFilipps*	Shrub	Exotic	Ornamental	
25	Combretaceae	*Terminalia catappa L* Indian almond.	Tree	Exotic	Ornamental,	
26	Combretaceae	*Terminalia mantaly H.Perrier* Umbrella tree	Tree	Exotic	Ornamental,	
27	Euphorbiaceae	*Cnidoscolus aconitifolius (Mill.) I.M.Johnst.*	Tree	Exotic	Ornamental	
28	Euphorbiaceae	*Codiaeum variegatum (L.) Rumph. ex A.Juss.*	Shrub	Exotic	Ornamental	
29	Euphorbiaceae	*Jatropha gossypiifolia L.*	Shrub	Exotic	Ornamental	
30	Fabaceae	*Afzelia quanzensis Welw.* Mbambakofi	Tree	Indigenous	Biodiversity	
31	Fabaceae	*Caesalpinia pulcherrima (L.) Sw.*	Shrub	Exotic	Ornamental	
32	Fabaceae	*Cynometra suaheliensis (Taub.) Baker f. ?*	Tree	Indigenous	Ornamental	Near Threatened (NT)
33	Fabaceae	*Delonix regia (Bojer ex Hook.) Raf.*	Tree	Exotic	Ornamental	
34	Fabaceae	*Leucaena leucocephala (Lam.) de Wit*	Tree	Exotic	Invasive	
35	Fabaceae	*Peltophorum pterocarpum (DC.) Backer ex K.Heyne*	Tree	Exotic	Ornamental	
36	Fabaceae	*Pithecellobium dulce (Roxb.) Benth.*	Tree	Exotic	Hedge plant	
37	Fabaceae	*Pongamia pinnata (L.) Pierre*	Tree	Exotic	Ornamental	
38	Fabaceae	*Senna siamea (Lam.) H.S.Irwin & Barneby*	Tree	Exotic	Ornamental	
39	Lauraceae	*Persea americana Mill.* Avocado	Tree	Exotic	Fruit	
40	Malvaceae	*Sterculia foetida L.*	Tree	Exotic	Ornamental	
41	Meliaceae	*Azadirachta indica A.Juss.* Neem/ Mwarobaini	Tree	Exotic invasive	Medicinal	
42	Moraceae	*Ficus benjamina L.*	Tree	Exotic	Ornamental	
43	Moraceae	*Ficus bubu Warb.* Epiphytic fig	Tree	Indigenous	Biodiversity	
44	Moraceae	*Ficus bussei Warb. ex Mildbr. & Burret,* Epiphytic fig	Tree	Indigenous	Biodiversity	

No.	Family	Species	Habit	Status	Comment	IUCN, CITES categories
45	Moraceae	*Ficus elastica Roxb. ex Hornem.* Rubber tree	Tree	Exotic	Ornamental	
46	Moraceae	*Ficus sansibarica Warb. ssp. Sansibarica,* Epiphytic fig	Tree	Indigenous	Roost for bats	
47	Moraceae	*Ficus sycomorus L.* Fig	Tree	Indigenous	Roost for bats	
48	Moraceae	*Milicia excelsa (Welw.) C.C.Berg* Mvule	Tree	Indigenous	Biodiversity	Near Threatened (NT)
49	Myrtaceae	*Psidium guajava L.* Common guava	Tree	Exotic	Fruit tree,	
50	Rutaceae	*Aegle marmelos (L.) Corrêa*	Tree	Exotic	Fruit tree	
51	Rutaceae	*Murraya paniculata (L.) Jack*	Shrub	Exotic	Ornamental, hedge plant	
52	Sapindaceae	*Majidea zanguebarica Kirk ex Oliv.*	Tree	Indigenous	Ornamental	
53	Sapotaceae	*Manilkara zapota (L.) P.Royen* Sapodilla	Tree	Exotic	Fruit tree,	
54	Verbenaceae	*Duranta erecta L.*	Shrub	Exotic	Ornamental, hedge plant	
55	Zamiaceae	*Encephalartos hildebrandtii A.Braun & var. hildebrandtii* Mombasa cycad	Tree	Indigenous	Ornamental Biodiversity	Near Threatened (NT), CITES Appendix II

A section of the garden understory dominated by exotic palm *Adonidia merrillii*. One of the Garden's 15 Ashok trees (*Polyathia longifolia*) can also be seen.

Threats to the vegetation

The vegetation in Uhuru Garden faces multiple threats:

- Tree felling without legal process or consultation with the public or the required range of experts
- Dumping of waste.
- Introduction of exotic and invasive tree species without expert consultation.
- The previous lack of a tree census (no baseline appears to exist).
- An apparent lack of urban forestry skills and knowledge, qualified silvicultural care, and tree management.

The section of Uhuru Garden from where the large mature mango tree was removed in May 2025.

Improper waste disposal and the stump of the felled *Peltophorum pterocarpum*.

Discussion

Fifty-five species of trees and shrubs were recorded in Uhuru Garden, a considerable number given its size: 16 are native to Kenya and nine (9) are characteristic of Kenya's coastal forest: *Mkilua fragrans, Rauvolfia mombasiana, Elaeis guineensis, Afzelia quanzensis, Cynometra suaheliensis, Ficus bussei, Ficus sansibarica, Majidea zanguebarica and Encephalartos hildebrandtii*. This is an important collection in a biome experiencing extraction pressure, degradation, fragmentation and land use change. At least one was represented by as many as eight individuals, constituting a possible seed source.

The 15 or so large mango trees are not indigenous, but create extensive shade, an invaluable ecosystem service. They are also a critical roost for keystone species of bats and birds which, among their many services, control insects and disperse seed up and down the Kenyan coast and into the interior. By roosting and dropping seed, the bats also create micro-habitats with unique plant assemblages, which have encouraged growth of epiphytic fig trees, which are further supportive of biodiversity.

In short, Uhuru Garden in the heart of Mombasa is an irreplaceable repository of mature exotic trees and indigenous trees and is a forage, roosting and nesting site for important fauna. A vital urban forest, where people go to exercise, rest and converse, its conservation, maintenance, and enrichment with additional tree species, with a focus on Kenyan coastal species, will benefit the rich diversity that it currently supports and the many people who visit and live around it.

One of very few designated green spaces in Mombasa, Uhuru Garden's trees cool air and mitigate extreme weather, benefits that extend beyond its boundaries. Future human introduction of trees for beauty, shade, biodiversity enrichment and conservation needs to be done in a planned manner with the input of city officials, botanists, mammal and bird experts, landscape architects, NGOs, CBOs, the local community and others.

It is strongly advised that future planting in Uhuru Garden only incorporate Kenyan coastal native plant species. There is abundant variety to negate the need for planting any more exotics. Many indigenous species are ornamental and decorative, and indigenous trees, once established, are generally less needy of water than exotics.

For the safety of people, during storms with high winds, the best way forward is to put out a public advisory and close Uhuru Garden altogether until the storm passes. This is standard practice in London's parks and the UK's Royal Botanical Garden Kew and in other cities with well elaborated tree plans. This, together with regular skilled tree surgery to remove dead branches, rather than removing trees, is the best way to prevent harm to Mombasa residents and visitors from falling trees or branches.

On 14 June 2025, this tree fell in Uhuru Garden, causing concern. Death and injury from trees are rare, however. Opened to visitors in 2011, Nairobi's Karura forest has had no such case while, in the UK, the National Tree Safety Group estimates that there is only a one in 20 million chance of being killed by a tree in a public open space. Notwithstanding this extremely low risk, Uhuru Garden should be closed on stormy days among other precautions.

Conclusion

Uhuru Garden's plant diversity is highly dependent on human intervention and natural regeneration as well as edaphic factors and climatic conditions. Proper management of this important urban forest is critical to make it a better place for both humans and the other biodiversity it hosts and to preserve it for perpetuity.

Recommendations

- Increase the size and cover of the indigenous vegetation.
- Encourage controlled increase of the number of indigenous plants, especially threatened species.
- Introduce no further exotic species to pave way for indigenous plants.
- Remove invasives such as *Leucaena leucocephala* and young Neem trees.
- Conduct tree monitoring and skilled pruning of trees that pose threat to visitors.
- Recognize that healthy trees are always colonized by other organisms and dieback is part of normal crown reduction as trees mature.
- Minimize tree removal and follow legal requirements and a consultative process in the case it may be necessary.
- Close the Garden and issue advisories to the public not to enter during adverse weather conditions such as windy and rainy days.

Bauhinia Mombasa is a threatened species of plant due to habitat loss. None currently present in the Garden.

Enriching Uhuru Garden with coastal tree and shrub species, such as those presented below, will render the Garden more resilient to pests, diseases and climate stresses while making it more attractive for both people and nature.

Fernandoa magnifica is highly decorative, its fallen flowers creating a red carpet. It would be an important addition.

Markhamia zanzibarica is a small tree 2 - 10 metres tall. Not present in the Garden, it is harvested from the wild for its timber and for medicine.

Majidea zanguebarica has highly ornamental seeds: Uhuru Gardens has just one individual.

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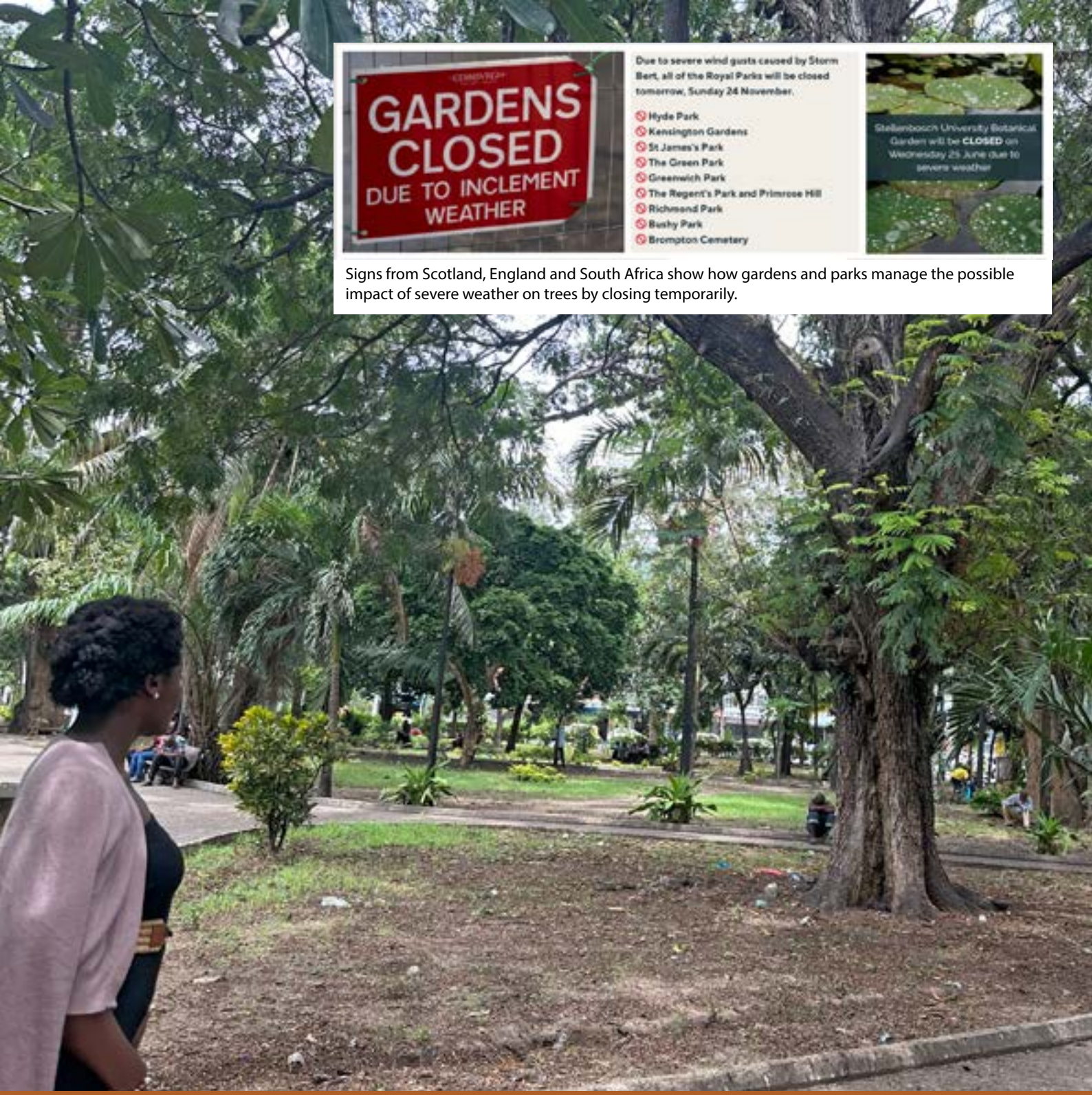
Clockwise: Uhuru Garden is a much-valued historical fixture in Mombasa: a marker notes that it underwent rehabilitation in 2007 and was re-opened by a Minister (Waziri). Unfenced, the Garden is flanked on one side by small shops and apartments that look directly into its vegetation. The Garden has many constituents: here members of youth-led CBO Together4Climate measure a large tree. The main entrance to the Garden is on Moi Avenue with its iconic elephant tusks. It provides major ecosystem services to walkers and users of buildings along this four-lane artery in Mombasa's central business district.



Signs from Scotland, England and South Africa show how gardens and parks manage the possible impact of severe weather on trees by closing temporarily.

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