



# Little Tree Book

(Tree Conservator)

**Make our trees  
healthy and safe**

By,  
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(AOEC, 2018)



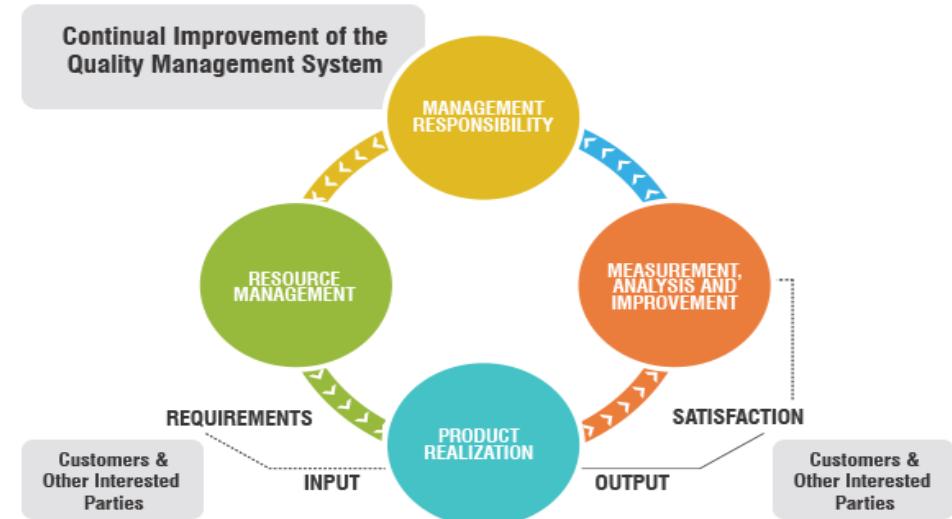
# About the Book



- This Little Book can bring in preparedness and readiness amongst governing authorities, civic bodies and can even help SMART City consultants mitigate hazards like tree fall or branch collapse.
- It can help in Gap assessment at any point in time to improve the vital health of trees in any landscape.

# NEXT Steps

- AOEC offers a software implementation specification for the grid if this is needed.
- AOEC offers a RERA (lite) + Disaster Mitigation specification to address the growing concern for the health of buildings and the effect of climate change at these sites.
- Both the specifications will use the Sustainable buildings + EHS guidelines and the ISO 9004 framework to deliver content and data analytics.



# About the Book



- The specification can be used to implement an add-on module for EHS or CCMA\*, where a municipal body may choose existing implementation platforms such as SAP ECC/ SAP MADP.
- Today EHS is fairly well-known for its relevance for an organization, but the need for a CCMA class of modules may make it easier for cities or civic authorities to implement solutions for Climate Change Mitigation & Adaptation. In this context, Tree Fall Risk Mitigation could then fit within this CCMA class/library.

# Model used in the Little Book

- The Little Book's theory and insights are based on the Natural Systems Interface (NSI) of a landscape and a global arborist theory to improve the health of trees.
- The Little Book's theory and insights are categorized into 3 areas of involvement
  - A. Preparedness
  - B. Readiness
  - C. Mitigation



# Expectations



- The Little Book's helps effectively build a Tree Grid for a location, region or city which in turn helps track & monitor trees and minimize accidents due to tree fall, branch collapse or falling debris.
- The Little Book uses the SMART methodology to strategically mitigate risks, threats & accidents via numerous arborist recommendations.
- **SMART** is an abbreviation for Specific, Measurable, Achievable, Realistic and Time-oriented.



# Climate change and impact

- The global warming trends that are apparent today are the melting of mountain glaciers on every continent, reductions in the extent of snow cover, earlier blooming of plants in spring, a shorter ice season on lakes and rivers, ocean heat content, reduced arctic sea ice, and rising sea levels.
- Adverse changes in the climate and weather does additionally mean that our forests, tree covers and afforestation drives will also be adversely affected.

# Climate change and impact



- Societal impact of climate change will be visible as
  - (a) The influence of severe drought, flash floods and sudden torrential rain on food production
  - (b) Drop in crop yield and need for SMARTER cropping patterns
  - (c) Rise in energy demand and air stagnation
  - (d) Impact of weather on aircraft takeoffs and landings
  - (e) Impact seen in overall transportation and commuter safety
  - (f) Conditions conducive to large mosquito populations and other disease causing scenarios



# Climate change and impact

- Uncontrolled urbanization and construction have made previously planted trees or even unplanned tree growth a hazard to man.
- The hazard being that as their roots, foundations and growth patterns have been affected, these trees are prone to falling down, snapping off where this causes damage to roads, buildings, man and other elements like transmission lines, telecommunication cables, TV cables and even other natural systems.



# Climate change and impact

- The major governmental response has so far been complaint redressals, timely cutting down of trees, trimming of branches or even restoration of trees. However due to climate change, the trends of incidences and nature of risk mitigation indicate that this step is not enough.
- As trees are very important for us, given that we are affected by global warming, climate change, increasing pollution levels with a need to urbanize, this book highlights the need for a Tree Grid.

# Climate change and impact



- Some lateral thinking on this issue reminds us that not long back, civic authorities kept track of protected varieties of trees by painting strips on them, and by tagging them as protected and owned by the government.
- Uncontrolled urbanization has led to the lack of enough information about the trees sidelining roads, stretches, sidewalks, important locations, where tree fall or branch collapses cause emergencies or adverse incidences.

# Climate Change Mitigation and Adaptation (CCMA)



- The Little Book reports that as urbanization and inhabitance is on the rise, there are going to be more and more scenarios of air pollution wherein the % of pollutants and greenhouse gases will be on the rise.
- Without suitable recommendations all these emissions will further lead to global warming or uncontrolled climate change, where the summers will be warmer, winters harsher and rains sudden with no forecast. Trees (**known to be the lungs of a location**) will face the brunt of severe weather.

# Climate Change Mitigation and Adaptation (CCMA)



- The Little Book expresses that it is the duty of all civic bodies involved in city planning and development to help ensure the health of trees and reduce the hazards of tree fall or falling debris.
- Productive interactions for this can be at the preparedness level, the readiness level and at the mitigation level.
- This can be aided by e-Solutions like Cloud, web enabled services and mobile applications.

# Climate Change Mitigation and Adaptation (CCMA)



- The Little Book focuses on dissemination of vital knowledge and remedial practices to improve the health of trees and also to minimize accidents due to unforeseen tree fall or branch collapse.
- The Tree Grid initiative will also make it possible for the civic authorities to monitor any unauthorized or unwarranted felling or pruning of trees. It will be easier to track tree covers and any afforestation that are vital components for climate change mitigation.

# Climate Change Mitigation and Adaptation (CCMA)



- As social accountability, civic bodies or forest departments can distribute the Little Book to
- (a) Zonal offices
- (b) Parks & gardens authorities
- (c) Builders & developers associations
- (d) Societies        (e) Apartment associations
- (f) Institutions & the rest of public who need this information. A ready to use edition is available on AOEC's Preserve Tree Grid web site. The URL is [www.venkataoec.wixsite.com/treeconservator](http://www.venkataoec.wixsite.com/treeconservator)

# Climate Change Mitigation and Adaptation (CCMA)



- The roadmap is to develop a “**Preserve Tree Grid**” that is designed on the basis of inputs from civic bodies, departments in charge of roads and transportation, builders and developers, connected entities, residents and owners of premises where trees sideline public infrastructure and other facilities.
- The term grid reflects a configuration that is well defined, manageable, fault tolerant and secure due to resilient systems maintenance. It may or may not refer to the technology used for its implementation.

# Climate Change Mitigation and Adaptation (CCMA)



- The **Preserve Tree Grid** is a framework that is made up of a **collection of simple management systems, processes and services** that help “record, audit or assess, maintain information about trees sidelining road systems, public infrastructure and other facilities” so as to minimize accidents due to tree fall, branch collapse or falling debris.

# Climate Change Mitigation and Adaptation (CCMA)



- Today people are used to the term Fast Track, so this roadmap calls the first component of the Tree Grid as the **Little Tree Track**, which includes a **Tree Health Desk**, a **Tree Location Tracker**, a **Configuration System** (based on Road systems and Public Infrastructure & Other Facilities) and **Emergency Response Services**.

# Climate Change Mitigation and Adaptation (CCMA)



- The **Tree Health Desk** is a **one-stop interface** to information and services that minimize accidents due to tree fall or branch collapse.
- The Tree Health Desk that is a customized Help Desk helps people, entities or civic representatives call in “to query, or to alert, or to configure information, or to ask for emergency assistance”.

# Climate Change Mitigation and Adaptation (CCMA)



- The Tree Health e-Desk (a mobile application) can be used by those with SMART phones.
- The Tree Health e-Desk implements a number of interfaces where some of them are:
- a. **Registration** as a grid member (as an owner, a resident, a concerned entity, or a civic body representative)

# Climate Change Mitigation and Adaptation (CCMA)



- b. **Recording of Locations** that need Tree Health tracking (names and key information of road systems, routes, stretches, public infrastructure & other facilities that have trees along their sidelines, or, are vulnerable to hazards due to tree fall or branch collapse)
- c. **Configuration of tree information** (either sidelining a Road system, or Public Infrastructure & Other Facilities [abbreviated as PI/F])

# Climate Change Mitigation and Adaptation (CCMA)



- d. **Help line for Emergency Response** (that permits a member to call in for help to assess Tree Health, evaluate Tree Health influencers to thereon restore trees, or even cut down trees, trim branches or clear debris)
- e. **Community Grievances Forum** (that permits members to raise grievances, complaints and concerns about the risks, threats, accidents or incidences related to trees)

# Climate Change Mitigation and Adaptation (CCMA)



- f. **Experts Reports**, where different experts related to the horticulture & floriculture field, the forestry department and civic governance speak out and provide information on the Trees Grid in the city or region.

# Climate Change Mitigation and Adaptation (CCMA)



- Technological advances have made it possible to track commodities, vehicles, people etc. The Tree Grid uses this identification and tracking technology to track trees in specific locations. The tracking is not a real time solution but includes Tree identification details with a Tree Hazards Assessment Report, which is used by an expert panel to decide the emergency response or next step of action.
- The experts for trees called **arborists** help cut down, save or maintain trees and thereon save life.

# Climate Change Mitigation and Adaptation (CCMA)



- Assessment of the Age of a Tree (by observation that is based on details available on the Internet)
- 1. Count the number of **growth rings** (possible only when the tree is felled or cut). Every year a tree adds a new ring of tissue as its trunk grows outward
- 2. Count the number of **tree whorls** (that is the number of largest branch whorls) and add 1 to the number
- 3. Measure **diameter of circumference of trunk** at an average man's chest height & **multiply this value by the growth rate** of the species

# Climate Change Mitigation and Adaptation (CCMA)



- **Assessment of the Age of a Tree (continued)**
- 4. Use an **increment borer** (to be done only by an arborist) to **remove a cylindrical portion** of the trunk near the base or below an average man's chest height. This portion can be used to count the growth rings.
- Importantly, care must be taken to help the tree heal or grow unaffected after the use of any method to estimate the age of the tree.

# Climate Change Mitigation and Adaptation (CCMA)



- **Assessment of the Age of a Tree (continued)**
- 5. Maintain a Tree Grid that **records the date and time of planting of any sapling or seed** with details that help know more about the plant or tree at any later point in time. This could be used to decide whether the tree should remain at its location or be shifted to a different location or even be put to other use. This may become important in the future when climate change could become more severe leading to alternate cycles of floods and drought, thereby affecting a region's tree cover.

# Climate Change Mitigation and Adaptation (CCMA)



- **Tree Hazards Assessment Report (a checklist that is easy to understand and use)**
- 1. Is the tree drought tolerant? If no then this is a hazard as it needs sufficient water and soil enrichment.
- 2. Do many branches arise from one point of the trunk?
- 3. Is the tree sensitive to anything (question is arborist specific)? If yes, then review items 8 to 11.
- 4. Are there large dead branches?

# Climate Change Mitigation and Adaptation (CCMA)



- 5. Are there detached large branches hanging from the tree?
- 6. Does the tree have cavities or rotten wood along the trunk or in major branches?
- 7. Are mushrooms present at the base of the tree?
- 8. Are there cracks or splits in the trunks or where the branches are attached?
- 9. Have any branches fallen from the tree?
- 10. Have adjacent trees fallen or died?

# Climate Change Mitigation and Adaptation (CCMA)



- 11. Have the leaves developed a premature unusual color or size?
- 12. Have the roots been broken off or injured or damaged by lowering the nearby soil level, or by constructing or repairing pavements or sidewalks, or by digging trenches for telephone cables or sewer systems?
- 13. Has the location or site been changed recently by construction activity or by soil level changes or by installing of lawns or green strips?

# Climate Change Mitigation and Adaptation (CCMA)



- 14. After stump removal was the hole filled with top soil before any new plantation? If no then the roots may not be healthy.
- If the answer is yes to any of the relevant questions, then the tree can be a hazard.
- A citizen, entity or civic body interested in registering a tree in the grid, will need to enter the following “Tree identification & configuration details” via a call to the Tree Health Desk, or submission of a hand-filled form, or use of a mobile application.

# Climate Change Mitigation and Adaptation (CCMA)



## Tree Identification and Configuration Details

- **Road System name:**

**Road System Id:**

**Lookup...**

**(OR)**

- **PI/F name:**

**PI/F Id:**

**Lookup...**

- **Tree-variet or friendly name:**

- **Tree Grid Id:**

**Generate...**

# Climate Change Mitigation and Adaptation (CCMA)



- **Estimated Age (in years by observation+):**
- **Estimated Height (in meters or feet):**
- **Type of Branching:**
- **Summary of condition or history:**
- **Enclosed picture (if any in mobile friendly formats): Yes/No**

# Climate Change Mitigation and Adaptation (CCMA)



- **Soil type:** (Choose from:) Normal hard dry soil/Normal dry soil/Wet soil (due to presence of subsoil water or surface water)/Black cotton soil/Alluvial soil/Red laterite soil/Sandy soil/Fissured rock/Hard rock
- **Soil details:**

# Climate Change Mitigation and Adaptation (CCMA)



- **(CRZ) Critical Root Zone details** (also known as drip line or an imaginary circle around the tree till where the canopy or branches seem to spread) - This is important to estimate the spread of the roots of the tree:
- **Nature of concrete work around tree:**

# Climate Change Mitigation and Adaptation (CCMA)



- **Clearances around tree:**
- **Overhead clearances:**
- The solution also permits the logging of a maintenance schedule for the tree being included in the grid.

# Climate Change Mitigation and Adaptation (CCMA)



- **Inspection or Maintenance schedule (tabulation):**
- **Log date:** **Log Id:** **Generate...**
- **Carried out by:**
- **Details of work carried out (to be filled as relevant to the case)**
- **(a) Visual inspection (tick as applicable)**
- **[ ] Tree Hazards Assessment (this checklist can be improved as per CRZ and related conditions)**
- **Details:**

# Climate Change Mitigation and Adaptation (CCMA)



- **(b) Closer inspection by expert (tick as applicable)**
- Diagnosis of tree and landscape problems
- Insect and disease identification and management
- Variety specific Hazard Assessment and Surveys
- **Details:**

# Climate Change Mitigation and Adaptation (CCMA)



- **(c) Preventive maintenance details (tick as applicable)**
- ( ) Training or Controlling growth patterns
- ( ) Eliminating branches and/or limbs that are dead, detached, rubbing each other or touching cables, lines
- ( ) Removing limbs that are diseased or insect infested
- ( ) Tree pruning
- ( ) Coppiced\* ( ) Pollarded\*

# Climate Change Mitigation and Adaptation (CCMA)



- **What is the meaning of Coppiced?**
- Most of the tree is removed to ensure safety and health
  
- **What is the meaning of Pollarded?**
- The trunk is left intact but the top branches are removed

# Climate Change Mitigation and Adaptation (CCMA)



- (c) Preventive maintenance details (tick as applicable)
  - ( ) Shrub and vine pruning
  - ( ) Tree removal and stump grinding
- **Details:**

# Climate Change Mitigation and Adaptation (CCMA)



- (d) Restoration details (tick as applicable)
- ( ) Installing support systems (cables and braces after expert evaluation)
- ( ) Improving shape or silhouette of tree
- ( ) Mulch delivery (mulch is recycled wood cut into chips, on the addition of a 2-4 inches of a mulch covering the root zone of a tree, there is more healthy root development)

# Climate Change Mitigation and Adaptation (CCMA)



- (d) **Restoration details (tick as applicable)**
- ( ) Planting ground coverings, shade tolerant plants, grasses that increase organic matter content of soil
- **Details:**

# Climate Change Mitigation and Adaptation (CCMA)



- (e) Risk mitigation details (tick as applicable)
- ( ) Creating better structure to “better wind resistance and reduce adverseness of storm damage”
- ( ) Removing branches or thinning to increase light generation

# Climate Change Mitigation and Adaptation (CCMA)



- (e) Risk mitigation details (tick as applicable)
- ( ) Guided pruning/cutting/topping (as confined to need)
- Details:

# Climate Change Mitigation and Adaptation (CCMA)



- Safety advisory (to be filled as relevant to the case):
- (a) Dos

# Climate Change Mitigation and Adaptation (CCMA)



- Safety advisory (to be filled as relevant to the case):
- (b) Don'ts

# Climate Change Mitigation and Adaptation (CCMA)



- **Safety advisory (to be filled as relevant to the case):**
- **(c) Help line responses or communications:**

# Climate Change Mitigation and Adaptation (CCMA)



- **(CGF) Community Grievance Forum's Incidences/Complaints details:**
- **Ticket Id:**
- **Ticket date and time:**
- **Ticket description:**
- **Ticket status:**
- **Select from [New/Open/Closed/Milestone(d)/Escalated to another authority/High priority resolution/Problem with resolution]**

Generate...

# Climate Change Mitigation and Adaptation (CCMA)



- **Summary of responses:**
- **Ticket Closure details:**



## Improved Accountability

- A citizen or reporting entity will be issued a ticket that summarizes what needs to be done or will be done to mitigate risk or adverse outcome.
- This ticket becomes a point of incidence for the civic authorities and arborist team to understand the issue and to plan remedial action.
- The ticket's status will remain open (for anyone interested in tracking the same) till there is satisfactory resolution of the issue.

# Helping out



- A citizen or reporting entity can also be given a recommendation to share details and findings with others (prone to be afflicted) in the neighborhood or zone to help sustain this initiative.
- Your team could choose to release certain news & social media based advisories, announcements, hoardings, signages and knowledge aids to help improve the sensitization, awareness and involvement of related entities, communities or citizens by large.

# Helping out



- **Tree Health Desk advisory (Will be notified by the Desk team)**
- ( ) **Trees cannot be planted in this region**
- **Details on restrictions:**

# Helping out



- **Tree Health Desk advisory (Will be notified by the Desk team)**
- ( ) Permission required to plant trees in this region
- Details on precautions:

# Helping out



- **Tree Health Desk advisory (Will be notified by the Desk team)**
- ( ) Stay off nearby road/stretch/route/ring road at particular times
- Details on timings:
- ( ) Stay off nearby road/stretch/route/ring road in particular months
- Details on months:

# Helping out



- **Tree Health Desk advisory (Will be notified by the Desk team)**
- ( ) Recommend minimal utilization
- ( ) Restricted for goods carriers
- ( ) Restricted for heavy motor vehicles
- ( ) Restricted for autos
- ( ) Restricted for 2-wheeler
- ( ) Restricted for pollution accelerators
- ( ) Connects or connected to bad roads or problem afflicted routes

# Helping out



- **Tree Health Desk advisory (Will be notified by the Desk team)**
- ( ) Not to be used by Emergency Response vehicles (like ambulances, fire engines)
- ( ) Not to be used by Special Needs vehicles (like VIP convoys, on-mission security vehicles, hazardous content tankers, water tankers, school-or-college vans or buses)

# Helping out



- **Tree Health Desk advisory (Will be notified by the Desk team)**
- ( ) Not to be used by two wheelers or cyclists
- ( ) Not to be used by pedestrians



# Tree Grid's Acknowledgement

- Finally a simple Thank You note to those citizens or entities who participate in the Tree Grid initiative could definitely help in making this endeavor more far reaching, impactful and socially accountable.



# Specific Case Articulation



- You can ask for more details on any specific case articulation (like remedial action for building damage or collapse, poorly maintained roads, incidence causing manholes, septic systems and potholes, Keep Your City Clean programmes or add-ons to the Swachh Bharat programmes) by sending an email to [venkataoec@gmail.com](mailto:venkataoec@gmail.com).
- The consultant offers an Operating Climate engineering toolkit on Gap assessment and bridging to implement Climate Change Mitigation and Adaptation (CCMA) for today's cities, towns and landscapes.



# Little Preparedness can help

- The consultant's note - It is not too late to start off on a much needed CCMA initiative to respond to emerging threats, improve the health of trees in a location and thereon reduce the hazard posed by tree fall or branch collapse.
- Civic bodies will need SMART tools to bridge gaps and mitigate risks in a sustainable manner. Today's citizens could be needing this book, where it might make a difference easily to life, property and the environment.